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Occurrence and Distribution of Marine Mammals off the Holderness Coast: Sightings made during Aerial Seabird Surveys – *Lucas Mander, Raymond Eades and Nick Cutts*

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Editor **M. R. D. Seaward** MSc, PhD, DSc, FLS, The University, Bradford BD7 1DP

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e-mail: m.r.d.seaward@bradford.ac.uk

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Registered Office (for all enquiries, correspondence and payments):

Mr John A. Newbould, Stonecroft, 3 Brookmead Close, Sutton Poyntz, Weymouth, Dorset DT3 6RS (tel: 01305-837384; email: john_newbould@btinternet.com)

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OCCURRENCE AND DISTRIBUTION OF MARINE MAMMALS OFF THE HOLDERNESS COAST: SIGHTINGS MADE DURING AERIAL SEABIRD SURVEYS

LUCAS MANDER, RAYMOND EADES and NICK CUTTS
Institute of Estuarine & Coastal Studies (IECS), University of Hull, Hull HU6 7RX
e-mail: L.Mander@hull.ac.uk

Abstract
There is growing interest in the marine mammal fauna inhabiting the waters off the East Yorkshire coast, where development pressures including proposed offshore wind farm operations are increasing. The planning of such activities and the mitigation of potential deleterious effects from these developments, for example the impacts of anthropogenic sound sources upon cetaceans, requires as a basis an understanding of the spatial and temporal distribution of species within the region. This paper presents an inventory of marine mammal sightings made during aerial seabird surveys carried out between July 2004 and March 2006 along the Holderness coast, these surveys involving line transect sampling methods from the nearshore, to a distance around 30km offshore, flown at a height of 80m. The results of the survey programme indicate a general distribution of harbour porpoise off the Holderness coast, but with a correlation in occurrence to deeper water. Seals were also recorded throughout much of the survey area, but with concentrations off the mouth of the Humber Estuary and, to a lesser extent, in the Bridlington Bay area.

Introduction

The distribution and abundance of cetaceans and pinnipeds for the North Sea is detailed in several publications (Reid *et al.*, 2003; Evans *et al.*, 2003). Further detailed information on the abundance of harbour porpoise *Phocoena phocoena* can be found in the Cetacean Assessment for the North Sea (SCANS) by Hammond *et al.* (1995). At a more regional level, the occurrence of cetaceans and pinnipeds has been well documented around the Humber Estuary (Howes, 2000a, 2000b, 2009). Along the Holderness coast, published records of cetaceans and pinnipeds have been biased towards records of dead and stranded animals (Delany, 1985); this is not surprising, as dead animals attract attention. In addition, the Holderness coast lacks a high vantage point, until Flamborough Head is reached. The observers at Spurn Bird Observatory have collated sightings, and many of these are detailed in the Spurn Wildlife Reports.

The cetacean fauna of the southern North Sea is relatively poor, both in numbers of animals and diversity of species. Two species of cetacea (whales, dolphins and porpoises) are commonly reported in the southern North Sea: harbour porpoise and white-beaked dolphin *Lagenorhynchus albirostris* (Evans *et al.*, 2003). The harbour porpoise is the only cetacean shown to be resident all year round. Several other species of cetacean have been recorded in the area but are considered to be rare visitors or vagrants. These include bottlenose dolphin *Tursiops truncates*, minke whale *Balaenoptera acutorostrata,* long-finned pilot whale *Globicephala melas*, killer whale *Orcinus orca*, sperm whale *Physeter macrocephalus*, humpback whale *Megaptera novaeangliae*, fin whale *Balaenoptera physalus,* short-beaked common dolphin *Delphinus delphis* and Atlantic white-sided dolphin *Lagenorhynchus acutus* (Howes, 2000a, 2005). The Holderness coast also supports regularly occurring pinnipedia (seals): common seal *Phoca vitulina* and grey seal *Halichoerus grypus*. Common seals are resident throughout the area for most of the year but generally move to Donna Nook to breed between June and August. The grey seal is also resident and breeds at Donna Nook between October and December.

An aerial study of the marine mammals off the Holderness coast has been lacking, and it was felt that the cetacean and pinniped sightings data gained through this programme of

aerial seabird surveys was worth presenting as a tentative baseline for future work. As such, this paper aims to show the relative abundance and distribution of marine mammals recorded during aerial surveys conducted between July 2004 and March 2006. It is also hoped that the findings of this study will form a baseline for future work.

Methods

Study area

The study area extends from Hornsea in the north to the outer Humber Estuary in the south and encompasses a large stretch of the Holderness coastal waters. The survey area of 1,600 km^2 includes a total of 20 transects running perpendicular to the coast, each one 28 km in length (Figure 1). Distance from the shoreline ranges from 1 to 7 km in the inshore waters, and from 28 to 37 km in the offshore waters. The topography of the survey area is characterised by shallow waters, with water depth not exceeding 20 m until 10-15 km offshore. Most of the survey area (>90%) is over water less than 30 m in depth. The offshore waters of the aerial survey area are on the edge of the 'Flamborough Front', one of the most distinctive fronts to the North Sea. This front occurs between the deeper waters to the north and the permanently vertically mixed waters to the south of Flamborough Head. This frontal zone extends eastwards, roughly following the 40 m depth contour from Flamborough Head to the German Bight (Doody *et al.*, 1993).

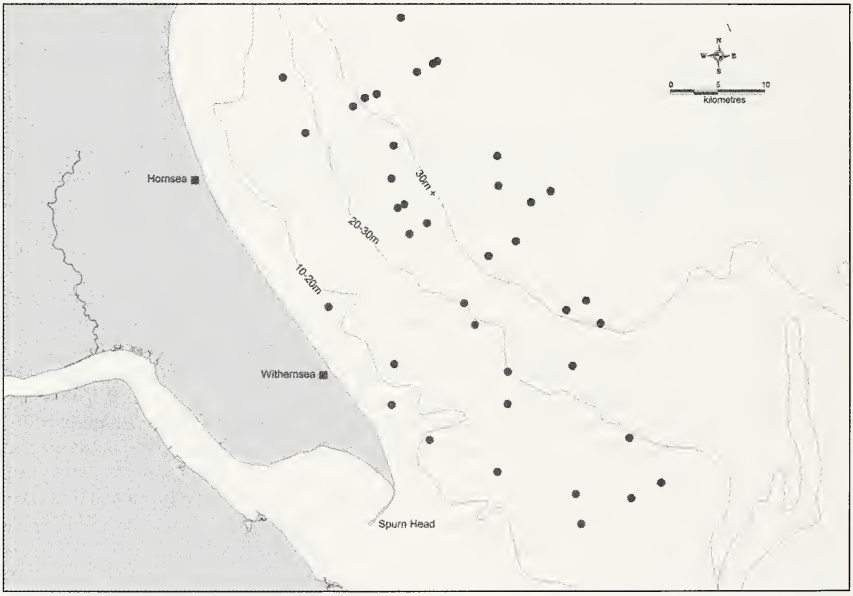

Figure 1. Distribution of harbour porpoise sightings between July 2004 and March 2006.

Aerial survey method

Aerial seabird surveys were scheduled to occur approximately once per month over a two year period and were conducted in accordance with the method given in Camphuysen *et al.* (2003). The 20 transects were travelled over a four hour period at a speed of 185 km/hr, and at an altitude of 80 m, with two observers looking down and ahead out of each side of the aircraft. The aircraft used for the surveys was a Partenavia PN68, a twin-engined high wing aircraft ideally suited to such survey requirements.

In addition to visual records of seabirds, all marine mammal sightings were recorded during the survey. The species and numbers of animals were recorded on a dictaphone, with each record identified by a time reference and synchronised to a Global Positioning System (GPS) to allow sightings to be linked to a specific position along the transect line. The distances from the transect and the bearings of the marine mammals were not recorded. Because of the speed of the aeroplane, observers used the naked eye to detect both seabirds and marine mammals. Whilst harbour porpoise could be confidently identified from the aeroplane; it was not possible to accurately identify seals to species level. Accordingly, such sightings of seals (grey seal or common seal) were recorded as seal species. Environmental data such as sea state and visibility were recorded every 20 min., or more frequently if environmental conditions changed during the survey. Efforts were made to conduct the surveys below Beaufort Sea State 3 but occasional observations were conducted in up to Beaufort Sea State 4.

Data analysis and map interpretation

The monthly abundance of harbour porpoise and seal species was examined as relative abundance rather than absolute abundance, since the survey effort over the two year programme was temporally uneven and focussed on addressing seabird recording requirements. Indeed, the survey area was covered twice in the summer months but only once in the winter months, whilst no surveys were carried out in December, April and May. However, as distance travelled and time spent sampling were identical during the surveys, sighting indices could be calculated per month to indicate relative monthly abundance. A sighting index is the number of animals sighted corrected for either distance travelled in the survey (no. of animals per km) or the amount of time spent watching (no. of animals per hr). In order to account for effort intensity per month the sightings were indexed against distance travelled during the month. Indices of sightings are therefore reported as (N/E), where N is the number of animals recorded per month and E is the total survey effort (km travelled by aeroplane per month). Sightings were also plotted on a map to provide an overall distribution of the harbour porpoise and seal species sightings.

Results

Harbour porpoise

The harbour porpoise was the most common cetacean recorded and the only one that was confidently identified to species level from the aeroplane. A total of 41 sightings was made from the aeroplane, totalling 52 individuals over 8,400 km of transect travelled. The relative abundance index recorded over the survey programme was 0.006 km^{-1}. A peak in relative abundance occurred in the summer with 0.021 animals km^{-1} (Table 1). The aerial survey found relatively fewer harbour porpoises during the autumn and winter months. Harbour porpoise were not recorded during the months of November, January and February.

Harbour porpoise records show a wide distribution across the study area but with a preference for the deeper water in the north of the study area (Figure 1).

Seal species

Seal sightings were recorded in all survey months during the two year survey programme. All seal sightings recorded were of single individuals, except for a sighting of two individuals in July 2004. In terms of overall abundance during the programme, seal species were most abundant during the summer months (Table 1). The index of relative abundance was the highest in August (0.017 km^{-1}). The winter months featured the lowest indices (Table 1). Seal species were mostly distributed in the southern part of the survey area: 70% of the individuals were found in coastal waters between Withernsea and the southernmost transect, with a concentration of sighting records off the mouth of the Humber Estuary (Figure 2). From Withernsea to the south of Hornsea, seal species were scarce: only four individuals detected during the survey programme, with the number of detections

increasing to the north of Hornsea where a second, less obvious, cluster of sightings was recorded.

Other marine mammals

A large unidentified cetacean was recorded in March 2006 c. 24 km offshore from the town of Hornsea.

TABLE 1
Monthly relative abundance indices of marine mammals

	Harbour porpoise		Seal species	
Month	**No. of animals**	**(No. of animals km^{-1})**	**No. of animals**	**No. of animals km^{-1})**
July	24	0.021	16	0.014
August	11	0.001	13	0.017
September	1	0.000	6	0.005
October	1	0.000	4	0.003
November	0	0.000	1	0.001
January	0	0.000	3	0.005
February	0	0.000	3	0.005
March	10	0.006	3	0.001
June	5	0.001	6	0.011
*No surveys were undertaken in December, April or May.				

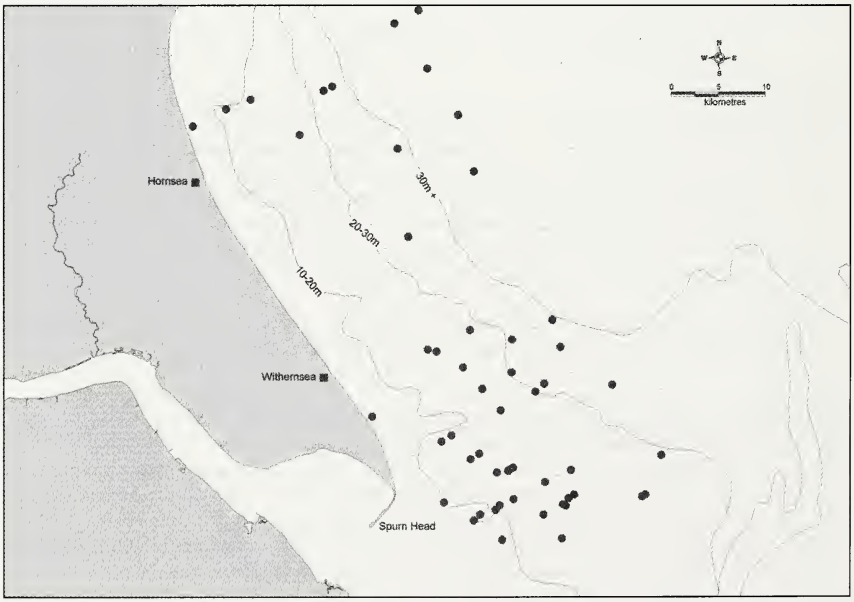

FIGURE 2. Distribution of seal sightings (grey seal and common seal) between July 2004 and March 2006.

Discussion

The relative abundance of marine mammal species sightings correlates with previous reported studies which found harbour porpoise and seal species to be the most common marine mammals recorded along the East Yorkshire Coast whilst dolphins and whales were less frequently recorded.

The results of the aerial survey programme described here identified a wide distribution of harbour porpoise across the study area, but with a preference for the deeper waters of the survey area. The highest index was recorded in the month of July. Coastal records for the species at Spurn indicate that individuals are present in the area in all months of the year, the largest group occurring from July to September (Howes, 2000a). Interestingly, the seasonal occurrence patterns observed during the survey programme and by Spurn sightings contrast with recent findings on the seasonality of harbour porpoise in estuaries and tidal rivers from the Tees to the Humber which indicate a peak of sightings in April (Howes, 2009).

The distribution of sightings of harbour porpoise during summer months was found to be similar to that of foraging aggregations of black-legged kittiwake *Rissa tridactyla* and auk species observed during the survey, roughly along the 30 m depth gradient, which perhaps suggests the occurrence of a frontal zone along this contour line. Indeed, it could be that the oceanography of the area has a substantial influence on the distribution of harbour porpoise, for instance during the peak periods of usage (July and August) the species appeared to be concentrated on the edge of the 'Flamborough front', with these waters potentially providing better feeding conditions.

It is also interesting that sightings were less numerous in the inshore waters of the survey area. There is a tendency for high levels of water turbidity up to around 3km from the Holderness coast, and on some surveys a distinct front was noted between inshore turbid waters and clearer water further offshore. This turbid zone is formed as a result of re-suspension of material along the inshore waters of the coast, primarily as a result of wave action. In addition, a plume originating from the highly turbid waters of the Humber Estuary occurs off the estuary mouth. During the survey, this area was observed to shift with the tidal currents off the mouth of the estuary, moving further north with the ebb tide, particularly to the north and east of Spurn Head. It was initially hypothesised that the differing turbidity levels along the coast might have caused significant variation in the visual detection rate of harbour porpoise from the air and thus explained the low numbers of sightings in inshore turbid waters. However, this hypothesis was subsequently rejected as observers succeeded in detecting seal species in these waters, indicating that the distribution of harbour porpoise was not the result of poor detection in the inshore waters, but may reflect an environmental preference for the species away from turbid waters, perhaps because they have an intolerance to high turbidity levels, or because it reduces their foraging efficiency.

It is difficult to compare the results of this study with large scale studies of distribution and abundance of harbour porpoise in the North Sea (Reid *et al.*, 2003; Hammond *et al.*, 2002) and caution should be taken in the interpretation of the survey data, as effort and sightings recorded in Beaufort Sea State 4 were used in the analysis. It has been shown that detection probabilities of harbour porpoise decline with sea state (Barlow, 1988; Palka, 1995a, 1995b). Hammond *et al.* (2002) indicated a sharp decline in the detection of harbour porpoise between Beaufort Sea State 2 and 3.

As for the seal populations, the number of seal sightings peaked in the summer, with the highest index recorded in August. It was not clear whether or not this increase was linked to common seals dispersing from the rookery at Donna Nook after the breeding season, with distribution possibly extending to the Lincolnshire coast and the South Holderness coast, but it is rather unlikely given that the grey seal is a far more numerous breeder on the site, with the species breeding during the late autumn and early winter.

Conclusions

Aerial surveys of seabirds using the inshore waters off the coast of Holderness between March 2004 and July 2006 yielded data on marine mammals which were used to calculate indices. The most abundant cetacean was harbour porpoise which tended to be seen in deeper water rather than in the inshore, and more turbid waters. Seal species sightings could not be identified from the survey platform, but their distribution was concentrated towards the mouth of the Humber with a peak in August.

Acknowledgments

The aerial survey work, carried out by the Institute of Estuarine and Coastal Studies (IECS), which generated the data described in this paper, was made available by E.ON as it was collected as part of the Environmental Impact Assessment for a proposed project in the area. The authors wish to thank Shona Thomson at IECS for her assistance during the survey work and Daryl Burdon (IECS) for proof reading this paper. The authors also wish to thank Dr Colin Howes and Prof. Mark Seaward for improving the manuscript.

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THE MARINE AND MARITIME ALGAE OF MERSEYSIDE AND ADJOINING COASTS

GEORGE RUSSELL
World Museum Liverpool, William Brown Street, Liverpool, L3 8EN

Introduction

The Victorian period saw a remarkable, and mainly amateur, enthusiasm for seaweed collecting, which was roughly contemporary with the rather better documented fern craze. Victorian Liverpool was unusual amongst British cities, however, in that it had two men with a professional interest in marine algae and who were active in compiling records of the local flora. R.J.H. Gibson, the first professor of Botany at Liverpool University, published in 1891 a check list of species present at several sites in the north Irish Sea, including the Merseyside region. The local records were, however, very largely the work of F.P. Marrat (1820-1904) who was based at Liverpool Museum.

Marrat's algal collections were made over a period of deteriorating water quality in the Mersey and a written comment by him on the increasingly unhealthy appearance of a number of algae in the river was quoted by Gibson (1891). The condition of the river was to worsen further, however, and it was not until the 1990s that a programme of major engineering works was initiated leading to notable improvement in the water quality. The restoration of the south docks in 1985 as a leisure and recreation resource for Liverpool and the construction of artificial reefs along the west bank of the outer estuary have created additional opportunities for algae.

New Survey

The aim of this investigation has been to see what species are currently present in the area and how these observations compare with the earlier flora. Species records began rather haphazardly during the 1960s, but it was not until the 1990s that a more thorough going and systematic approach was taken. The new records therefore cover the period of clean-up and its aftermath.

The scope of this investigation has almost certainly been greater than that of the 1891 survey. Algae have been collected from the tidal limit of the Mersey (at Warrington) downstream to New Brighton on the west bank and to Crosby on the eastern shore. Further samples have been taken northward along the Sefton coast (still under the influence of Mersey water) to a little beyond Southport.

The vertical range of sampling also exceeded that of 1891 in that algae were collected from sites in the maritime zone; for example, from damp sand in the lee of primary sand dunes. In one case, *Prasiola crispa*, the records were made from an unofficial urinal in Liverpool city centre where saline and nitrogen-rich conditions encouraged growth.

It is clear from Gibson's account that some of the seaweed records were of driftweed cast ashore, probably on the Sefton coast. This was common practice among Victorian marine biologists and so, in order to compare like with like, driftweed was also sampled in this investigation. A separate report on driftweed has been made by Russell and Felton (2009).

Checklist

In the combined list of species records for 1891 and 2009 below genera are arranged in alphabetical order within their respective Orders. Species names and authorities follow Whitton (2002) for the Cyanophyta; Hardy and Guiry (2003) for the Rhodophyta, Phaeophyta and Xanthophyta, and Brodie, Maggs and John (2007) for the Chlorophyta. The localities numbered in the text are as follows:

1. Howley Weir, Warrington
2. Fiddler's Ferry
3. Widnes
4. Hale

5. Oglet
6. Grassendale – Otterspool
7. Liverpool including South Docks
8. Crosby
9. Hall Road – Hightown
10. Formby – Birkdale
11. Southport
12. Marshside
13. Preston
14. R. Weaver
15. Norton Marsh
16. Eastham
17. Seacombe
18. Seacombe – New Brighton
19. New Brighton
20. King's Parade

Species names preceded by [G] were included in his list by Gibson (1891) but were not observed in the present survey. Species preceded by [GD] were recorded by Gibson but now occur only as driftweed and those preceded by [D] are present only as driftweed. Records of Xanthophyta were, for the greater part, made by Mr R. Merritt and are included by Hardy and Guiry (2003) in their checklist; these species are preceded by [M]. Further information on the records is available on request from the author.

Phylum CYANOPHYTA

Order CHROOCOCCALES

Aphanocapsa litoralis Hansgirg
10; maritime, dune slack; rare.

Chroocopsis amethystea (Rosenvinge) Geitler
6,19-20; eulittoral, on barnacles, algae; occasional.

Chroococcus minutus (Kützing) Nägeli
6,14, 18, 20; supralittoral, eulittoral; on barnacles, marsh grasses, promenade wall; occasional.

Chroococcus turgidus (Kützing) Nägeli
5, 10, 19-20; supralittoral, eulittoral; on barnacles, algae, damp sand; occasional.

Cyanocystis violacea (Crouan) Komárek & Anagnostidis
8, 10, 18; eulittoral; on algae; occasional.

Dermocarpa prasina (Reinsch) Bornet & Flahault
10, 16, 19; eulittoral; on algae especially driftweed; common.

Dermocarpa sphaerica Setchell & Gardner
19; eulittoral; on algae; rare.

Entophysalis granulosa Kützing
8; eulittoral; on barnacles; rare.

Gloeocapsa crepidinum Thuret *sensu* Geitler
4, 6-8, 11, 14, 16-20; supralittoral, eulittoral; on rock, barnacles, algae; abundant.

Gomphosphaeria aponina Kützing
10; maritime; on sand, shallow water in dune slack; rare.

Gomphosphaeria pusilla (Goor) Komárek
10; maritime; on sand, shallow water in dune slack; rare.

Hyella balani Lehmann
6, 8, 18-20; eulittoral; in barnacle shells; common.

Hyella caespitosa Bornet & Flahault
19-20; eulittoral; in barnacle shells; rare.

Merismopedia punctata Meyen
10; maritime; wet sand in dune slack; rare.

Microcrocis irregularis (Lagerheim) Geitler
9; eulittoral; in salt pan in marsh; rare.

Microcystis litoralis (Hansgirg) Forti
19; supralittoral; in boating lake; rare.

Microcystis minuta Kylin
6, 19; supralittoral; on promenade walls, barnacles; rare.

Microcystis reinboldii (Richter) Forti

6-8, 10, 14, 16, 17, 20; maritime, supralittoral, eulittoral; on rock, barnacles, sand; common.

Pleurocapsa crepidinum Collins
4, 6-8, 14, 16, 18; supralittoral, eulittoral; on rock, dock walls, barnacles; common.

Pleurocapsa minuta Geitler
6, 17, 19, 20; eulittoral; on barnacles, algae; occasional.

Xenococcus kerneri Hansgirg
18-20; eulittoral; on algae; occasional.

Xenococcus schousboei Thuret
19-20; supralittoral; on algae; rare.

Order OSCILLATORIALES

Lyngbya aestuarii (Liebmann) Gomont
7, 9, 16; supralittoral, upper eulittoral; epilithic, salt pans; occasional.

Lyngbya confervoides (C. Agardh) Gomont
19; sublittoral; on algae in marine lake; rare.

Lyngbya lutea (C. Agardh *emend.* Gomont) Gomont
1, 7, 10, 16; supralittoral, upper eulittoral; epilithic, on algae; occasional.

[G] *Lyngbya majuscula* (Harvey in Hooker) Gomont
16; no other information.

Lyngbya meneghiniana (Kützing) Falkenberg
7; sublittoral; on mussels in docks; rare.

Lyngbya semiplena (C. Agardh) J. Agardh
10; maritime; on damp sand in dune slack; rare.

Microcoleus chthonoplastes (Thuret) Gomont
12; upper eulittoral; in saltmarsh; rare.

Microcoleus tenerrimus (Crouan) Gomont
6; upper eulittoral; on pebbles; rare.

Oscillatoria agardhii Gomont
9; eulittoral; in salt pans; rare.

Oscillatoria amphibia (C. Agardh) Gomont
9, 10, 18-19; upper eulittoral; on barnacles, in saltmarsh and dune slacks; occasional.

Oscillatoria brevis (Kützing) Gomont
6, 9, 13, 15-16; maritime, upper eulittoral; numerous substrates; locally common.

Oscillatoria formosa (Bory) Gomont
19-20; upper eulittoral; on barnacles; rare.

Oscillatoria limnetica Lemmermann
20; upper eulittoral; planktonic in origin? on barnacles; rare.

Oscillatoria limosa (C. Agardh) Gomont
10, 12; maritime, upper eulittoral; on wet sand, in saltmarsh; rare.

Oscillatoria margaritifera (Kützing) Gomont
7; sublittoral; on mussels in docks; rare.

Oscillatoria nigroviridis (Thwaites in Harvey) Gomont
7, 9, 13, 16; supralittoral, eulittoral, sublittoral; numerous substrates; occasional.

Oscillatoria sancta (Kützing) Gomont
9; upper eulittoral; on mud, in salt pans; rare.

Oscillatoria splendida (Greville) Gomont
10; maritime; on damp sand in dune slacks; rare.

Oscillatoria tenuis (C. Agardh) Gomont
9, 12-13, 18; upper eulittoral, sublittoral; in saltmarsh, docks; occasional.

Phormidium ambiguum (Kützing) Gomont
2, 7, 14; supralittoral, upper eulittoral; on rock, pontoons in docks, algae; occasional.

Phormidium autumnale (C.Agardh) Gomont
2; upper eulittoral; on mud; rare.

Phormidium corium (C.Agardh) Gomont
10, 13, 16, 18-19; maritime, upper eulittoral; in damp sand in dune slack, on stones, barnacles; occasional.
Phormidium ectocarpi Gomont
7; supralittoral; on dock walls; rare.
Phormidium fragile (Meneghini) Gomont
6, 17-18; supralittoral; on promenade walls, rock; occasional.
Phormidium okenii (C. Agardh) Anagostidis & Komárek
9; upper eulittoral; in salt pan; rare.
Phormidium tenue (Meneghini) Gomont
6, 7, 13, 19; supralittoral, eulittoral; on walls of docks, boating lake, promenade; common.
Plectonema battersii Gomont
6, 7; supralittoral, eulittoral; on walls of docks, promenade; rare.
Plectonema golenkinianum Gomont
17; supralittoral; epilithic.
Plectonema terebrans Bornet & Flahault ex Gomont
18-20; eulittoral; on barnacles; occasional.
Schizothrix vaginata (Kützing) Gomont
4; supralittoral; epilithic; rare.
Spirulina maior (Kützing) Gomont
9-10; maritime, upper eulittoral; in salt pans, on damp sand in dune slacks; rare.
Spirulina rosea Crouan ex Gomont
7; sublittoral; on sea squirts in docks; rare.
Spirulina subsalsa (Oersted) Gomont
9, 18; eulittoral; in saltmarsh; occasional.
Spirulina subtilissima (Kützing) Gomont
18, 20; upper eulittoral; on barnacles; rare.

Order NOSTOCALES
Anabaena torulosa (Lagerheim) Bornet & Flahault
10, 16; maritime; on damp sand in dune slacks; rare.
Calothrix scopulorum (C.A. Agardh) Bornet & Flahault
7, 11, 19; supralittoral; on walls of docks, boating lakes; occasional.
Cylindrospermum sp.
10; maritime; on damp sand in dune slacks; rare.
Nodularia harveyana (Thuret) Bornet & Flahault
10; maritime; on damp sand in dune slacks; rare.
Nostoc linckia (Roth) Bornet & Flahault
8, 10; maritime, upper eulittoral; epilithic and in dune slacks; occasional.
Pontothrix longissima (Molish) Nadson & Krassilin
7, 9, 19; eulittoral, sublittoral; on various algae; occasional.
[G] *Rivularia atra* (Roth) Bornet & Flahault
In R. Mersey, but no other information.
[G] *Rivularia biasolettiana* (Meneghini) Bornet & Fahault
16; no other information.

Order STIGONEMATALES
Mastigocoleus testarum (Lagerheim) Bornet & Flahault
6; upper eulittoral; on barnacles; rare.

Phylum RHODOPHYTA
Order ERYTHROPELTIDALES
Erythrocladia irregularis Rosenvinge

7, 10, 18, 20; eulittoral; on various algae; occasional.
[D] *Erythrotrichia bertholdii* Batters
10; among driftweed; epiphytic on algae; rare.
Erythrotrichia carnea (Dillwyn) J. Agardh
7, 9-10, 19-20; eulittoral, sublittoral; on algae, hydroids; common.
Erythrotrichia investiens (Zanardini) Bornet
19; eulittoral; epiphytic on algae; rare.

Order BANGIALES
Bangia atropurpurea (Roth) C. Agardh
7, 20; supralittoral; on walls of docks and promenade; rare.
Porphyra linearis Greville
19; lower supralittoral, upper eulittoral; epilithic; rare (locally common).
Porphyra purpurea (Roth) C. Agardh
6-9, 17-20; eulittoral, shallow sublittoral (in docks); epilithic; common.
Porphyra umbilicalis (Linnaeus) Kützing
18-20; lower supralittoral; epilithic, on concrete reefs; occasional.

Order ACROCHAETIALES
Acrochaetium parvulum (Kylin) Hoyt
7; sublittoral; epiphytic on algae; rare (locally common).
Acrochaetium secundatum (Lyngbye) Nägeli
7, 10, 16-17, 19-20; eulittoral, sublittoral; on various algae; common.
Rhodochorton purpureum (Lightfoot) Rosenvinge
10, 16, 19; upper eulittoral; among driftweed; epilithic; on mussel shells; occasional.

Order COLACONEMATALES
Colaconema daviesii (Dillwyn) Stegenga
7, 19-20; eulittoral, sublittoral, epiphytic on algae; occasional.

Order PALMARIALES
Palmaria palmata (Linnaeus) Kuntze
7, 10; sublittoral, among driftweed; epilithic and epiphytic on algae; rare.

Order GELIDIALES
[G] *Gelidium crinale* (Turner) Gaillon
16; no other information.

Order GRACILARIALES
[D] *Gracilaria gracilis* (Stackhouse) Steentoft, L.M. Irvine & Farnham
10; on stone bearing driftweed; rare.

Order HILDENBRANDIALES
Hildenbrandia rubra (Sommerfelt) Meneghini
10; on stones bearing driftweed; rare (unconfirmed local records).

Order CORALLINALES
[D] *Corallina officinalis* Linnaeus
10; on limpet shells bearing driftweed; rare.
[D] *Lithophyllum incrustans* Philippi
10; on stone bearing driftweed; rare.
[D] *Phymatolithon lenormandii* (J.E. Areschoug) Adey
10; on stone bearing driftweed; rare.
[D] *Titanoderma pustulatum* (J.V. Lamouroux) Nägeli
9; on driftweed; rare.

Order GIGARTINALES
Catenella caespitosa (Withering) L.M. Irvine
16, 19-20; upper eulittoral; epilithic, on barnacles; occasional.
Chondrus crispus Stackhouse
16, 20; eulittoral, in rock pools; epilithic; occasional.
Choreocolax polysiphoniae Reinsch
10; on driftweed; rare.
[G] *Cruoria pellita* (Lyngbye) Fries
19; no other information.
[G] *Cystoclonium purpureum* (Hudson) Batters
19; no other information.
[G] *Furcellaria lumbricalis* (Hudson) J.V. Lamouroux
16, 19; no other information.
[G] *Gymnogongrus griffithsiae* (Turner) Martius
19; no other information.
[D] *Polyides rotundus* (Hudson) Greville
10; among driftweed; rare.

Order PLOCAMIALES
[GD] *Plocamium cartilagineum* (Linnaeus) P.S. Dixon
10, 19; among driftweed; rare.

Order RHODYMENIALES
[GD] *Lomentaria articulata* (Hudson) Lyngbye
10, 16, 19; among driftweed; rare.

Order CERAMIALES
Aglaothamnion hookeri (Dillwyn) Maggs & Hommersand
10, 19; eulittoral; epilithic (19), among driftweed (10); occasional.
[G] *Anotrichum barbatum* (C. Agardh) Nägeli
19; no other information.
Antithamnionella floccosa (O.F. Müller) Whittick
7; sublittoral; on pontoon in dock; rare.
Callithamnion corymbosum (J.E. Smith) Lyngbye
7; sublittoral; on pontoon in dock; rare.
[D] *Ceramium botryocarpum* A.W. Griffiths ex Harvey
20; among driftweed; rare.
[G] *Ceramium ciliatum* (J. Ellis) Ducluzeau
19; no other information.
Ceramium deslongchampsii Chauvin ex Duby
7, 10, 16-17, 19-20; eulittoral, sublittoral; on various substrates; abundant.
Ceramium diaphanum (Lightfoot) Roth
7, 19; eulittoral, sublittoral; epilithic (19), on pontoon in dock; rare.
[D] *Ceramium pallidum* (Nägeli ex Kützing) Maggs & Hommersand
10; among driftweed; epiphytic; rare.
Ceramium virgatum Roth
7, 10, 16, 19-20; eulittoral, sublittoral; epilithic, epiphytic on various algae; common.
[D] *Cryptopleura ramosa* (Hudson) Kylin ex Lily Newton
10; among driftweed; epiphytic; rare.
[G] *Halurus flosculosus* (Ellis) Maggs & Hammersand
19; no other information.
[G] *Nitophyllum punctatum* (Stackhouse) Greville
19; no other information.
[G] *Odonthalia dentata* (Linnaeus) Lyngbye

19; no other information.
[D] *Pleonosporium borreri* (J.E. Smith) Nägeli
10; among driftweed; epiphytic; rare.
[G] *Polysiphonia atlantica* Kapraun & J.N. Norris
16, 19; no other information.
Polysiphonia brodiae (Dillwyn) Sprengel
7; sublittoral; on pontoon in dock; rare.
[D] *Polysiphonia elongata* (Hudson) Sprengel
10; among driftweed; epiphytic; rare.
Polysiphonia fibrata (Dillwyn) Harvey
10; among driftweed, on limpet shells; rare.
Polysiphonia fibrillosa (Dillwyn) Sprengel
7; sublittoral; on pontoon in dock; locally common.
[G] *Polysiphonia fucoides* (Hudson) Greville
16, 19; no other information.
[GD] *Polysiphonia lanosa* (Linnaeus) Tandy
8-10; epiphytic, among driftweed; locally common.
Polysiphonia stricta (Dillwyn) Greville
7, 9-10, 16, 19-20; eulittoral, sublittoral; epilithic, epiphytic, on pontoons; common.
Pterothamnion plumula (J. Ellis) Nägeli
7, 10, 19; eulittoral, sublittoral; on various substrates; common.
[G] *Rhodomela lycopodioides* (Linnaeus) C. Agardh
16; no other information.

Phylum PHAEOPHYTA
Order SPHACELARIALES
[GD] *Sphacelaria cirrosa* (Roth) C. Agardh
10; among driftweed; epiphytic; rare.
Sphacelaria nana Nägeli ex Kützing
16, 19; upper eulittoral; epilithic; occasional.
Sphacelaria radicans (Dillwyn) C. Agardh
16, 17, 19; upper eulittoral; epilithic; occasional.

Order DICTYOTALES
[D] *Dictyota dichotoma* (Hudson) J.V. Lamouroux
10; among driftweed; epiphytic; rare.

Order ECTOCARPALES
Acinetospora crinita (Carmichael) Sauvageau
19-20; eulittoral; epilithic, epiphytic; occasional.
Botrytella micromora Bory de Saint-Vincent
7; sublittoral; on mussels in dock; rare.
[G] *Chordaria flagelliformis* (O.F. Müller) C. Agardh
16; no other information.
[G] *Dictyosiphon foeniculaceus* (Hudson) Greville
16; no other information.
[D] *Ectocarpus fasciculatus* Harvey
10; among driftweed; epiphytic; rare.
Ectocarpus siliculosus (Dillwyn) Lyngbye
7, 10,16, 19-20; eulittoral, sublittoral; epiphytic, in rock pools, docks; common
Elachista fucicola (Velley) J.E. Areschong
5-6, 8-10, 16, 18-20; eulittoral; epiphytic, among driftweed; common.
[D] *Elachista scutulata* (J.E. Smith) Duby
9-10; among driftweed; rare.

Hecatonema terminale (Kützing) Kylin
7, 19; eulittoral; epiphytic, in rock pools; occasional.
Hincksia granulosa (J.E. Smith) P.C. Silva
7, 10, 19; eulittoral, sublittoral; on various substrates in docks, rock pools; occasional.
Hincksia ovata (Kjellman) P.C. Silva
7; sublittoral; on various substrates in docks; occasional.
Hincksia sandriana (Zanardini) P.C. Silva
7; sublittoral; on various substrates in docks; locally common.
Hincksia secunda (Kützing) P.C. Silva
7; sublittoral; epiphytic, in dock; rare.
[D] *Laminariocolax tomentosoides* (Farlow) Kylin
10; among driftweed; epiphytic; rare.
[D] *Leathesia difformis* (Linnaeus) J.E. Areschoug
10; epiphytic among driftweed; rare.
Leptonematella fasciculata (Reinke) P.C. Siva
7; sublittoral; in docks; rare.
Litosiphon laminariae (Lyngbye) Harvey
7, 10; sublittoral, among driftweed; on mussels in dock (7), epiphytic (10); rare.
Microspongium globosum Reinke
6; eulittoral; epiphytic; rare.
Mikrosyphar polysiphoniae Kuckuck
7, 16, 19-20; eulittoral, sublittoral; epi-endophytic; locally common.
Myrionema magnusii (Sauvageau) Loiseaux
7; sublittoral; epiphytic; rare.
Petalonia fascia (O.F. Müller) Kuntze
7, 19-20; eulittoral, sublittoral; in rock pools, docks; occasional.
Petalonia zosterifolia (Reinke) Kuntze
7, 10, 18; eulittoral, sublittoral; among driftweed, in rock pools, docks; occasional.
Pogotrichum filiforme Reinke
7; sublittoral; epiphytic; in dock; rare.
Protectocarpus speciosus (Børgesen) Kuckuck ex Kornmann
7; sublittoral; epiphytic; in dock; rare.
Punctaria latifolia Greville
7; sublittoral; on various substrates in docks; locally common.
Punctaria tenuissima (C. Agardh) Greville
7, 19; eulittoral, sublittoral; epiphytic; in rock pools, docks; occasional.
Pylaiella littoralis (Linnaeus) Kjellman
6-9, 10, 16, 18-20; eulittoral, sublittoral, among driftweed; epiphytic, epilithic; abundant.
Scytosiphon dotyi M.J. Wynne
7, 19; sublittoral; on walls of docks, boating lake; occasional.
Scytosiphon lomentaria (Lyngbye) Link
7, 19; eulittoral, sublittoral; in docks, rock pools, on various substrates; occasional.
[GD] *Spongonema tomentosum* (Hudson) Kützing
10; among driftweed; epiphytic; rare.
Stictyosiphon soriferus (Reinke) Rosenvinge
7; sublittoral; on dock walls; rare.

Order RALFSIALES
Petroderma maculiforme (Wollny) Kuckuck
19; eulittoral; on barnacles; rare.

Order DESMARESTIALES
Desmarestia viridis (O.F. Müller) J.V. Lamouroux
7; sublittoral; on pontoons in docks; rare.

Order LAMINARIALES
[D] *Chorda filum* (Linnaeus) Stackhouse
9-10, 20; among driftweed; occasional.
[D] *Laminaria hyperborea* (Gunnerus) Foslie
10; among driftweed; rare.
[GD] *Laminaria saccharina* (Linnaeus) J.V. Lamouroux
10; among driftweed; rare.
[now *Saccharina latissima* (Linnaeus) C.E. Lane, C. Mayes, Druehl & G.W. Saunders]

Order FUCALES
Ascophyllum nodosum (Linnaeus) Le Jolis
6, 8-10, 16, 19; eulittoral (at 16), among driftweed; locally abundant.
[D] *Fucus ceranoides* Linnaeus
10; among driftweed; rare.
[D] *Fucus serratus* Linnaeus
9-10; among driftweed; rare.
Fucus spiralis Linnaeus
6, 8, 10; upper eulittoral (6), among driftweed, epilithic; occasional.
Fucus vesiculosus Linnaeus
4-10, 16, 18-20; eulittoral, among driftweed; abundant.
Fucus spiralis x *vesiculosus*
5-6, 8, 16-20; eulittoral, among driftweed, abundant.
[D] *Halidrys siliquosa* (Linnaeus) Lyngbye
9-10; among driftweed; occasional.
[D] *Himanthalia elongata* (Linnaeus) S.F. Gray
9-10; among driftweed; occasional.
Pelvetia canaliculata (Linnaeus) Decaisne & Thuret
10, 20; lower supralittoral (20), among driftweed; occasional.
[D] *Sargassum muticum* (Yendo) Fensholt
10; among driftweed; occasional.

Phylum XANTHOPHYTA
Order VAUCHERIALES
Vaucheria compacta (F.S. Collins) F.S. Collins ex W.R. Taylor
1, 9; eulittoral; on mud, in saltmarsh; occasional.
[M] *Vaucheria coronata* Nordstedt
In Mersey, site unclear; no other information.
[G] *Vaucheria dichotoma* (Linnaeus) Martius
19; no other information.
[M] *Vaucheria erythrospora* T.A. Christensen
In Mersey; site unclear.
Vaucheria litorea C. Agardh
7; sublittoral; on various substrates; also present in Mersey but sites unclear; occasional.
[M] *Vaucheria medusa* T.A. Christensen
?14; no other information.
[M] *Vaucheria synandra* Woronin
?14; no other information.
[M] *Vaucheria subsimplex* P.L. Crouan & H.M. Crouan
?10; no other information.
Vaucheria velutina C.Agardh
5, 7, 9, 16; eulittoral; on mud, in saltmarsh; occasional.

Phylum CHLOROPHYTA

Order CHLOROCOCCALES

Chlorococcum submarinum Ålvik
6, 7; supralittoral, sublittoral; on posts, dock pontoons; occasional.

Order PRASIOLALES

Prasiola calophylla (Carmichael ex Greville) Kützing
6, 7, 15, 20; supralittoral; epilithic, on stones in mud, city centre; occasional.

Prasiola crispa (Lightfoot) Kützing
6, 7; maritime; at bases of posts, also in city centre; rare.

Prasiola stipitata Suhr ex Jessen
4, 6, 7-8, 11, 16, 18-20; supralittoral; on various hard substrates; common, locally abundant.

Rosenvingiella polyrhiza (Rosenvinge) P.C. Silva
1-2, 6; maritime, supralittoral, upper eulittoral; on various substrates, also in city centre; occasional.

Rosenvingiella radicans (Kützing) Rindi, McIvor & Guiry
10; upper eulittoral; on mud in saltmarsh; rare, locally common.

Order ULOTRICHALES

Acrosiphonia arcta (Dillwyn) Gain
10, 16, 19; eulittoral; epilithic, among driftweed; occasional.

Capsosiphon fulvescens (C. Agardh) Setchell & N.L. Gardner
13; sublittoral; on dock wall; rare.

Gayralia oxysperma (Kützing) K.L. Vinogradova ex Scagel
7; eulittoral; epilithic, on dock wall; rare.

Gomontia polyrhiza (Lagerheim) Bornet & Flahault
11, 20; eulittoral; on barnacles, cast up mollusc shells; occasional.

Monostroma grevillei (Thuret) Wittrock
7, 11, 16, 19; eulittoral, sublittoral; epilithic, in rock pools, docks; common.

[D] *Spongomorpha aeruginosa* (Linnaeus) van den Hoek
10; among driftweed; rare.

Ulothrix flacca (Dillwyn) Thuret in Le Jolis
6-7, 10, 14-15, 18-20; supralittoral, eulittoral, sublittoral; epilithic, on pontoons, barnacles; common.

Ulothrix implexa (Kützing) Kützing
1, 8; eulittoral; epiphytic; occasional.

Ulothrix speciosa (Carmichael ex Harvey in Hooker) Kützing
6, 20; eulittoral; epiphytic; occasional.

Ulothrix subflaccida Wille
4, 6-7, 10, 13, 19; lower supralittoral, eulittoral, sublittoral; on various substrates, also in city centre; common.

Urospora penicilliformis (Roth) Areschoug
7, 16, 19-20; supralittoral, eulittoral, sublittoral; on various substrates, also in docks; occasional.

Order ULVALES

Acrochaete repens Pringsheim
6, 20; eulittoral; epiphytic on driftweed, barnacles; rare.

Acrochaete wittrockii (Wille) R. Nielsen
6, 8; eulittoral; epiphytic; rare.

Blidingia marginata (J. Agardh) P. Dangeard
2-5, 9-10, 15-16, 18, 20; lower supralittoral, upper eulittoral; in saltmarsh, on firm substrates; common.

Blidingia minima (Nägeli ex Kützing) Kylin
2-3, 6-11, 15-16, 18-20; lower supralittoral, upper eulittoral; epilithic, epiphytic; abundant.
Blidingia ramifera (Bliding) Garbary & Backhouse
3-4, 6, 8-9, 11, 16-20; lower supralittoral, upper eulittoral; on hard substrates, epiphytic; abundant.
Epicladia sp.
9, 11, 16, 19; eulittoral; on barnacles, epiphytic; occasional.
Percursaria percursa (C. Agardh) Rosenvinge
7, 9-10, 19; eulittoral, sublittoral; epilithic, on mud; occasional.
Pringsheimiella scutata (Reinke) Marchewianka
18-20; eulittoral; epiphytic; occasional.
Pseudendoclonium submarinum Wille
6-7, 9, 11, 14, 18, 20; eulittoral, sublittoral; epiphytic, also in saltmarsh; common.
[G] *Ulva clathrata* (Roth) C. Agardh
16; no other information.
Ulva compressa Linnaeus
7-10, 17, 19, 20; eulittoral, sublittoral; epilithic, epiphytic, among driftweed; common.
Ulva flexuosa Wulfen
7, 11; sublittoral; on walls of docks, boating lake; occasional.
Ulva intestinalis Linnaeus
2-4, 6-12, 16, 18-20; eulittoral, sublittoral; on various hard substrates, epiphytic; common.
Ulva lactuca Linnaeus
6-8, 10, 17-20; eulittoral, sublittoral; on various substrates, epiphytic; common.
Ulva linza Linnaeus
7, 9-11, 19; eulittoral, sublittoral; in rock pools, docks; common.
Ulva prolifera O.F. Müller
3-4, 6-10, 12, 14, 16, 18-20; eulittoral, sublittoral; epilithic; common, locally abundant.
Ulva rigida C. Agardh
6-7, 9-10, 16, 19-20; eulittoral, sublittoral; epilithic, on pontoons, among driftweed, common
Ulva torta (Mertens) Trevisan
3, 7; eulittoral, sublittoral; epilithic, epiphytic; rare.
Ulvella lens P. Crouan & H. Crouan
8, 19; eulittoral; epiphytic, among driftweed, on barnacles; rare.

Order CLADOPHORALES
[G] *Chaetomorpha aerea* (Dillwyn) Kützing
16; no other information.
Chaetomorpha linum (O.F. Müller) Kützing
7, 16, 19-20; eulittoral; epilithic, on pontoons in docks; common.
[G] *Chaetomorpha ligustica* (Kützing) Kützing
7; no other information.
Cladophora albida (Nees) Kützing
7, 16; eulittoral, sublittoral; on dock walls, pontoons; occasional.
[G] *Cladophora flexuosa* (O.F. Müller) Kützing
16, 19; no other information.
[G] *Cladophora fracta* (O.F. Müller ex Vahl) Kützing
16; no other information.
Cladophora glomerata (Linnaeus) Kützing
13; sublittoral; at tidal limit of R. Ribble; ? occasional.
[GD] *Cladophora hutchinsiae* (Dillwyn) Kützing
9; among driftweed; rare.

Cladophora laetevirens (Dillwyn) Kützing
6, 7, 19-20; eulittoral, sublittoral; epilithic, in docks; occasional.
Cladophora rupestris (Linnaeus) Kützing
10, 16-17, 19-20; eulittoral; epilithic, among driftweed; locally common.
Cladophora sericea (Hudson) Kützing
1, 16-19; eulittoral; epilithic; occasional.
Cladophora vagabunda (Linnaeus) van den Hoek
7, 19; eulittoral, sublittoral; in docks, boating lake, rock pools; locally abundant.
Rhizoclonium riparium (Roth) Harvey
1-2, 4, 7-13, 16-20; on various hard substrates, mud, among driftweed; common.

Order BRYOPSIDALES
Bryopsis hypnoides Lamouroux
7; sublittoral; on dock walls, pontoons; locally common.
Bryopsis plumosa (Hudson) C. Agardh
7, 19; eulittoral, sublittoral; in rock pools, docks, on walls, pontoons; occasional.
Codium fragile (Suringar) Hariot subsp. *fragile*
10, 19; sublittoral; epilithic in boating lake, among driftweed; rare.

Discussion

The following table summarises the records according to the major algal groups:

Phylum	1891	2009	Gains	Losses
Cyanophyta	7	65	61	3
Rhodophyta	23	55	45	13
Phaeophyta	7	50	45	2
Xanthophyta	2	9	8	1
Chlorophyta	14	52	43	5
TOTALS	53	231	202	24

It is possible that the greatly increased number of species in all major groups is a direct consequence of improved water quality, but some caution is needed. Many of the newly recorded algae are small in size requiring good microscopy for their determination (e.g. the Cyanophyta) and Marrat, for technical reasons perhaps, largely ignored these. The Cyanophyta also illustrate the fact that the taxonomy of small algae has advanced greatly during the century since the publication of the 1891 report.

It is interesting to note the species recorded in 1891 but not found in the present investigation. These 'losses' may be explained, in part at least, by misidentification by one or other of the authors (no algal list is error-free). Furthermore, some of the species found in 1891 may still occur on Merseyside but have simply escaped collection. Other species, however, are now quite definitely absent. A case in point is a red alga *Polysiphonia lanosa*, an epiphyte of the large brown seaweed *Ascophyllum nodosum*. This species was evidently still common in the Mersey in 1891, but is now found only on drift *A. nodosum* cast ashore from more distant coasts. It is indeed a reliable indicator of distant origins of driftweed on the coast.

So, while the results show the Merseyside flora to be more diverse than expected and to be increasing in richness, it is clear that some of the species that vanished during the period of pollution have so far failed to reappear. The region, therefore, provides excellent opportunities for the study of marine vegetation recovering from a prolonged period of perturbation.

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BOOK REVIEWS

Water-starworts *Callitriche* of Europe by **R.V. Lansdown**. Pp. 180, with numerous line drawings & maps. BSBI Handbook no.11. Botanical Society of the British Isles, London. 2008. £15.00 paperback in plastic wallet. [Available from: Summerfield Books, 3 Phoenix Park, Skelton, Penrith, Cumbria CA11 9SD.]

This is the latest in the series of handbooks published by the Botanical Society of the British Isles, and deals very thoroughly with a small family of aquatic plants that are notoriously difficult to identify because of their very variable morphology, particularly with regard to leaf characters. Because of the small number of native British species involved, it has also been possible here to take in the wider geographical range of European (non-British) species, resulting in very detailed treatment of 17 taxa including one hybrid. Apart from very comprehensive descriptive text for all taxa, the book contains numerous excellent line drawings of the respective species, plus leaf sections, flower morphology and fruit shape, together with hectad dot maps of their British and Irish distribution and smaller scale maps showing the European distribution of species in dark shading.

The first part of the book, before the individual species accounts, deals in considerable detail with field identification, providing keys to both European *Callitriche* taxa and British and Irish taxa, both with and without the use of microscopy. More general sections cover structure and variation in vegetative and reproductive features, looking in detail at leaf shape and the structure and nature of fruits and fruiting characters. There are also shorter sections on the ecology and habitats of *Callitriche* species and their conservation. There are notes at the end of the book on unresolved taxa about which some taxonomic doubt still remains. There is also a comprehensive glossary of terms, a generous bibliography, and a full index, giving synonymy where applicable, as well as an appendix giving details of the herbaria visited and material studied in the preparation of this book.

There is very little to find fault with in the scope and content of this work. The only problem one can envisage in the use of this Handbook by the average (or even competent!) botanist, is that it may be difficult, initially, to get one's head round the rather detailed identification keys, involving the use of perhaps unfamiliar terminology, as well as microscopy at greater magnification than the normal x10 and x20 lenses with which most of us are familiar. In this respect, this is not a book for the beginner, and one should certainly have some prior knowledge of the features of *Callitriche* species before using it.

Nevertheless, this handbook is, unquestionably, a very well compiled and thorough treatise on the family *Callitrichaceae* in Europe. It lacks nothing in content and presentation and the author, an acknowledged expert in his field, is to be congratulated on its production.

GTDW

The Natural Garden Handbook by **Caroline Foley**. Pp. 192, incl. numerous coloured plates & line drawings. New Holland Publishing, London. 2009. £12.99 hardback.

Designed to appeal to the non-expert gardener striving to be both greener and more ecologically conscious, this book covers such topics as wildflower meadows, woodland, hedges, green roofs, encouraging bird and insect life, ponds and compost heaps. The readable text is reasonably informative and offers helpful and practical advice, supplemented with quite useful line drawings, However, the choice of photographic illustrations is decidedly peculiar, being in too many instances of dubious use and prone to inaccuracy. Why did the author choose to illustrate such a random selection of plant and animal species, with, for example, many attractive birds (e.g. Crested tit, Corncrake, Great Crested Grebe) unlikely to be seen in a garden setting as they are rare or their habitat could not be generated within other than a stretch of specialised landscape amounting to several acres. As regards inaccuracies, these are liberally sprinkled throughout the book, with for example several misnamed organisms, the most blatant being the caption to *Hepatica nobilis*, a non-native flowering-plant, as "Liverwort" and "amongst the most ancient of plants and often referred to as the simplest true plant. Their 6,000-8,000 species are distributed globally"; fortunately the author has got it right in the text (p.106). The picture of the Frogbit is clearly not this, but a small *Nymphaea* water-lily, and a picture of probably *Nuphar lutea*, actually showing two Odonata copulating, does not illustrate the flower or leaves. Other organisms are also difficult to identify from the plates, such as butterflies with folded wings, and some illustrations are not referred to in the text! The 'List of British Native Plants' (21 pages) is superfluous. Nice idea, reasonable text, but shame about the plates which occupy a major proportion of the book.

VAH

Tropical Forest Community Ecology edited by **Walter P. Carson** and **Stefan A. Schnitzer**. Pp. xvii + 517, incl. numerous illustrations. Wiley-Blackwell, Chichester. 2008. £39.99 paperback.

For those like me who trained as botanists, the bible for the subject under review was Paul Richards' *The Tropical Rain Forest*, first published in 1952. Clearly things have moved on since then, but at the time there was nothing to compete with this pioneer work. Today, our knowledge of tropical rainforests, although still deficient in many respects, can be ecologically treated in depth and with confidence from a particular standpoint within a single volume. The work under review does just that, the many authors involved in generating chapters on a wide variety of topics providing an unequalled resource. Whether this multi-authored work provides a suitable basis for an undergraduate textbook remains to be seen, but researchers, specialists and libraries will find this an invaluable aid.

MRDS

Islands by **R.J. Berry**. Pp. xiv + 384, incl. numerous coloured & b/w illustrations, line drawings, maps & tables. New Naturalist Library, Collins, London. 2009. £50.00 hardback, £30.00 paperback.

The content of the latest volume (the title is actually *The Natural History of Islands* as on the title-page) in this much loved series maintains the high standard we have come to expect, which is not surprising as the author has contributed three other titles to the New Naturalist Library. The production too is of a high standard, with the illustrative matter interwoven within the relevant text (as distinct from wedges of plates in earlier volumes), which is much more satisfactory; however, less successful is the unjustified right-hand margin which gives the text an unfinished appearance. Treatment as in most other volumes in the series covers both Britain and Ireland, but in this case, because of the very nature of the study, takes in the Faroe Islands. The author's exploration of innumerable islands is

manifested not only in the enthusiasm he engenders but also in the wealth of information he has assembled for a wide range of disciplines. The uniqueness of island life, often brought about by genetic isolation, endemicity, survival, island development, the human impact upon them and their fragility, and the naturalists who have studied them are but few of the interesting elements covered. Six chapters are devoted to regional studies, essentially (1) Faroe, Shetland and Orkney, (2) Between Britain and Ireland, (3) Rockall to Barra Head, (4) Ireland, (5) Scillies and Channel Islands and (5) Thanet to Bell Rock. The whole is excellently supported by References & Further Reading, a 20-page Bibliography and useful Index. Strongly recommended.

MRDS

Essentials of Ecology by **Colin R. Townsend**, **Michael Begon** and **John L. Harper**. Pp. xii + 510, incl. numerous coloured illustrations. 3rd edition. Blackwell Publishing, Oxford. 2008. £29.99 softback.

The latest edition of this standard textbook is, as the title says, essential for the student of ecology, being packed with a diversity of information drawn from worldwide sources. The work is divided into four parts, the first looks at 'Ecology and how to do it' and 'Ecology's evolutionary backdrop', the second 'Conditions and resources', the third 'Individuals, populations, communities and ecosystems', and the fourth 'Applied issues in ecology'. The latter is devoted to sustainability, habitat degradation and conservation, as one would expect of an up-to-date work. At the start of each chapter key concepts are listed, and at the end of the chapter a summary is given and review questions are provided. The book is copiously illustrated and supported by a detailed bibliography and useful index.

MRDS

Darwin's Luck: chance and fortune in the life and work of Charles Darwin by **Patrick H. Armstrong**. Pp. xv + 195, including b/w illustrations. Continuum, London. 2009. £25.00 hardback.

Patrick Armstrong is a world authority on Darwin, particularly his travels on *HMS Beagle*, and over the years his published output has added considerably to our knowledge of Darwin. His latest title takes a refreshing look at the good fortune (and occasionally misfortune) which contributed to Darwin's achievements; the chapter titles alone give some measure of this, as, for instance, 'To lose one parent is a misfortune: childhood and adolescence', 'Cambridge: it's who you know as much as what you know', 'Sailor's luck', 'From London's dirt, noise, vice and misery to an extraordinary rural and quiet village' and 'The down and up of family life'. Although some of the plates (and captions) are a little disappointing, and a few minor errors have been noted (e.g. Charles Waterman instead of Charles Waterton), the text is both scholarly and a good read.

MRDS

Endless Forms. Charles Darwin, Natural Science and the Visual Arts edited by **Diana Donald** and **Jane Munro**. Pp. xiv + 344, with numerous illustrations. Yale University Press, London. 2009. £40.00 hardback.

This magnificently produced work, published in association with The Fitzwilliam Museum, Cambridge and The Yale Center for British Art, accompanies an exhibition of the same title which opened at The Fitzwilliam Museum in June of this year. However, it is much more than an exhibition catalogue in that it contains a wealth of information provided by a dozen scholars eminent in a wide range of topics, included within the following headings: Darwin at Home; Darwinian Theory and the Picturing of the Natural World, The Descent of Humankind – Animal Ancestry, Cultural Evolution and Racial Theory; Darwin, Aesthetic Theory and Nineteenth-century Art Movements. The textual apparatus includes copious

notes at the end of each chapter, a detailed checklist of the exhibits, selected bibliographies and an index, as well as a Foreword by the Directors of the two Institutions involved, a Preface and a splendid 27-page Introductory chapter. The exhibition itself, composed of 220 exhibits ranging from Darwin's collection of pigeon skulls and rare publications to paintings by Cézanne, Degas and Monet, is beautifully portrayed in this volume, the publishers, editors and authors of which should be congratulated. Those not fortunate enough to have visited the exhibition will not be disappointed by this substitute.

MRDS

Letters to Linnaeus edited by **Sandra Knapp** and **Quentin Wheeler**. Pp. xii + 324, incl. numerous coloured illustrations. The Linnean Society, London. 2009. £15.00 softback, plus postage & packing. [Visit www.linnean.org to download order form.]

This collection of actual and invented correspondence is a delight from cover to cover, the contributors, editors and publishers providing an eclectic mélange of treats. The modern-day correspondents, with the benefit of hindsight, have addressed their views of his pioneer work and expressions of appreciation posthumously to Linnaeus. More than 60 letters from eminent biologists from across the world pay personal and fitting tributes to Linnaeus and his legacy for his profound influence on taxonomy and systematic biology not only from their own personal points of view but also on behalf of innumerable naturalists over the past 250 years, in some cases indicating what we might expect in the next 250 years. Letters vary in style and content, but contribute significantly to a spectrum ranging from the serious to the humorous, particularly the one turning Linnaeus down for the title of Professor Emeritus, which tickled this reviewer's fancy. The texts of the letters are interspersed by beautiful colour illustrations, and between several letters there are thumb-nail sketches and illustrations relating to former key naturalists who were influenced by Linnaeus. A delight for the eyes, and a most enjoyable read – strongly recommended.

MRDS

The Arctic: the complete story by **Richard Sale**. Pp. 632, incl. numerous coloured & b/w illus. Frances Lincoln, London. 2008. £45.00 hardback.

This lavishly produced and weighty tome is a remarkable publication covering all things polar, the culmination of a lifetime's work by the author; his authoritative text, which covers geology, climate, wildlife, ecology, and the history of human exploration and settlement, is supported by stunning photography (by Per Michelsen and Richard Sale) and a wealth of other illustrative matter. The wildlife section is devoted to birds (128 pp.), terrestrial mammals (44 pp.) and marine mammals (24 pp.); notes on Antarctic wildlife are also provided for comparative purposes (as in other sections). Further sections include 'A traveller's guide to the Arctic' and 'A vulnerable ecosystem'. Boxed information highlights important points. Examples to support all sections are drawn from Alaska, Canada, Greenland, Iceland, Norway, Russia and Svalbard. Rather curiously, the origin or basis of text material and some illustrative matter from secondary sources has not been cited, and no bibliographical references are provided. Despite these reservations, this is indeed a remarkable work – and what a present this would make on Christmas Day!

MRDS

YORKSHIRE NATURALISTS' UNION EXCURSIONS IN 2008

Compiled by
ALBERT HENDERSON and ADRIAN NORRIS

THORPE SALVIN / CHESTERFIELD CANAL AREA (VC63) 17 May 2008

INTRODUCTION (Bob Marsh)
On an overcast day with intermittent heavy showers, 15 members assembled to study the fauna and flora of the Chesterfield Canal towpath and woodlands in the Thorpe Salvin area (NGR centrum SK522810). Of the local woodlands, Broad Wood, Hawks Wood and Old Spring Wood were visited, as was Pennyholme Marsh. Several members made the canal towpath a specific target. After the field meeting, the indoor meeting was held at the Parish Oven public house by kind permission of the owners; highlights of the reports are detailed below.

CONCHOLOGY (A. Norris)
Three conchologists took part in the day's activities, two attending from the national society, with a fourth joining us at the end of the day for the indoor meeting. Five 1 x 1 km squares were sampled and a total of 36 species was recorded, resulting in 70 new records for the recording scheme. The Chesterfield Canal proved to be in a much better condition than expected, a great deal of sediment having been removed in recent years, so that it was not so overgrown as we remembered from previous visits. Although only small numbers were found, in some cases only single specimens, a total of nine freshwater species did occur in the canal and hopefully the molluscan fauna will improve over the coming years. The woodland on both banks of the canal proved to be very interesting. Spring Wood contained large numbers of *Merdigera obscura,* which were found crawling up the trees, a sure indication of the wet conditions. The intermittent rain which had occurred over previous days also brought out large numbers of slugs with a total of nine species being recorded on the day. The best of these, *Limax cinereoniger*, an ancient woodland indicator, was found in Hawks Wood (SK528813). The site provided us with a very interesting and productive day's recording.

COLEOPTERA (Bob Marsh)
The species count for the day was only 105, a consequence of the rather mediocre weather. Generally, the species found were fairly common and widespread beetles. However, Jim Flanagan found in Old Spring Wood, in company with other woodland coleoptera, the Notable B carabid *Pterostichus oblongopunctatus*. Eric Smith found (in the same locality) amongst other staphylinids *Gyrophaena gentilis, G. minima* and *G. joyoides*, all in decaying fungi. Of the latter rather scarce species, only seven other county records are known. Netting in the canal proved disappointing, with *Nebrioporus elegans* and *Agabus bipustulatus* being found by Bob Marsh, who also found the weevils *Cionus alauda* and *C. scrophulariae* on *Scrophularia* on the canal towpath, and Bill Dolling netting the water beetles *Haliplus immaculatus, H. laminatus* and *Hydroporus palustris*. *H. laminatus* is a Notable B insect and has previously been recorded from nearby Thorpe Salvin and Kiveton Park. Bill Dolling noted *Chalcoides aurata* on a broad-leaved *Salix*. Piles of cut grass along the edge of the towpath were examined by Bob Marsh and found to be very productive of the smaller Staphylinidae including the rather scarce *Myllaena kraatzi*.

HYMENOPTERA AND DIPTERA (A. Grayson)
Winds were slight, but the day was cloudy and unseasonably cold, punctuated with light showers. Such weather was not conducive to insect activity; the writer's failure to see even a single butterfly was testimony to the unfavourable conditions. At Devil's Hole Bridge

(SK518822), many species took refuge amongst the abundant vegetation, including the soldier-fly *Beris chalybata*, and the hoverflies *Melanostoma mellinum*, *Platycheirus peltatus* and *Syrphus ribesii*. Here too, males of the hoverflies *Cheilosia albitarsis* and the less common *C. ranunculi* were found on flowers of *Ranunculus* along the canal path. Other hoverflies recorded included *Eristalis interruptus* in Turner Wood and *Rhingia campestris* at Low Spring Bridge. Lush vegetation along the canal paths contained queens of the following bumblebees: *Bombus lapidarius*, *B. lucorum*, *B. pascuorum* and *B. terrestris*.

HEMIPTERA (W.R. Dolling)
The disappointing weather affected collecting. Niblum Quarry yielded only *Zyginidia scutellaris*, whilst Frank Kenington swept the Woundwort Shieldbug *Eysarcoris fabricii* (now *E. venustissimus*) just north of the railway line at Turnerwood. An unusually dark female anthocorid *Anthocoris confusus* was swept in Broad Wood, and the related *A. nemorum* was everywhere as usual. The towpath produced several of the mirid *Orthops cervinus* on Hawthorn, an unusual host, and a single male of the coreid bug *Coriomeris denticulatus*, once rare in Yorkshire but now more frequently encountered, at least in the south of the county. Along with the water beetles in the canal were a male and a female corixid *Sigara dorsalis*.

PLANT GALLS (Tom Higginbottom)
A number of mite galls were discovered on the trees at the edge of Hawks Wood. There were fine rolls on the edges of the leaves of beech, elder, spindle and lime. Mites also caused pimple galls on the leaves of alder, blackthorn, hawthorn, field maple and sycamore. On the underside of the leaves of lime and sycamore, often between the leaf-veins, there were examples of the erineum galls also caused by mites. The distinctive bright red nail galls caused by the mite *Eriophyes tiliae* were present on lime leaves. *Blennocampa phyllocolpa*, a sawfly, was responsible for rolling the leaves of dog rose. Deeper in the wood a single example was discovered of *Melampsora populnea*, a fungal gall causing bright orange aecia to distort a leaf of dog's mercury. In Old Spring Wood the most interesting gall was caused by the gall wasp *Andricus quercuscorticis*. The agamic generation of this cynipid was the cause of a cluster of small pits embedded in the bark surrounding an area where a branch had been damaged and removed. *Macrodiplosis pustulans*, the only midge gall discovered during the day, had rolled downwards on an oak leaf lobe. On wych elm there was an example of a witch's broom structure, probably caused by the bacterium *Agrobacterium tumefaciens*. There was also a distinct roll on the margins of some leaves caused by the aphid *Eriosoma ulmi*.

BOTANY (Don Grant)
The area visited is situated on Magnesian limestone at the county's southern edge, a region of low wooded hills with many disused quarries and lime works. Both Hawks Wood and Old Spring Woods were carpeted with *Allium ursinum*. In Hawks Wood there were several *Orchis mascula* growing by the path side. There were also colonies of *Sanicula europaea* and several bushes of *Daphne laureola*. Many years ago the writer was shown a tree of *Sorbus torminalis* in Old Spring Wood, but we were unable to locate it on this occasion. The Chesterfield Canal (narrow boats only), running east to west through the area, has had a major overhaul over the last three years and is navigable to the tunnel just west of Kiveton Park Railway Station. Plants are now recolonising the canal and *Sparganium emersum, Alisma plantago-aquatica Potamogeton natans* and *Elodea nuttallii* were found. Thankfully much *Glyceria maxima* had been removed during the clean-up and it was only present in small quantities. The side of the canal had many tall plants of *Scrophularia aquatica*. The towpath had been improved and the hedges were in good condition and *Cornus sanguinea* and *Clematis vitalba* were seen, together with several clumps of *Festuca arundinacea*. Very few brambles grow on limestone soils but *Rubus vestitus, R. eboracensis, R. caesius* and

R. warbenii were recorded. On the brickwork of the entrance to the disused canal tunnel at Kiveton Park there is a colony of *Parietaria judaica*.

LANDSCAPE (John Newbould)

The Chesterfield Canal area was visited on the Monday following the meeting. Four hedges were surveyed immediately to the west of the canal at Kiveton Park on the coal measures' natural area and 13 hedges at Harthill, Thorpe Salvin and Kiveton Station within the Magnesian limestone natural area. The grassland of Pennyholme (SK498522), which was also examined, has deteriorated due to overgrazing in recent years. Here a small area of herb-rich grassland was located south of the footpath, with *Lotus corniculatus, Conopodium majus and Pilosella officinalis* present, but *Potentilla erecta* had disappeared since the last visit. The extensive wet area had dried out with only small pools of water remaining, although *Ranunculus aquatilis* subsp. *aquatilis* together with *Alopecurus geniculatus* was present on the dried mud.

Most of the hedges surveyed were in agricultural land south of the canal, with four of them in the Pennyholme area and on land adjacent to the old Kiveton colliery site. One of these hedges had *Petasites fragrans* in its margin, a species scarce in Rotherham with existing records located in SK59. These hedges were dominated by hawthorn. Twelve of the remaining hedges were principally adjacent to arable land with one hedge forming the northern boundary of Cuthbright Wood – a beech plantation. Analysis of the wood species found in hedges is as follows:

Species		**Harthill (CM)**	**(SML) Harthill**	**Thorpe Salvin**	**Total**
Acer campestre	Field Maple		6	1	7
A. pseudoplatanus	Sycamore		1		1
Cornus sanguinea	Dogwood		3		3
Corylus avellana	Hazel		3	1	4
Crataegus monogyna	Hawthorn	4	7	4	15
Euonymus europaeus	Spindle		1	1	2
Fraxinus excelsior	Ash		6	2	8
Ilex aquifolium	Holly	1	1	1	3
Prunus domestica	Greengage		1		1
Prunus spinosa	Blackthorn		3	3	6
Ribes uva-crispa	Gooseberry	1			1
Rosa canina	Dog Rose		4	2	6
Sambucus nigra	Elder	4	4		8
Tilia x *vulgaris*	Common Lime		1	1	2
Ulmus glabra	Wych Elm		1		1
Ulmus procera	English Elm	1	4	1	5
Viburnum opulus	Guelder Rose		1		1
Total species		**4**	**16**	**10**	**17**
No. of hedges surveyed		**4**	**9**	**4**	**17**

The hedges contained four NVC woodland communities, namely **W8** *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland (8 hedges), **W21** *Crataegus monogyna-Hedera helix* scrub (7 hedges), **W22** *Prunus spinosa-Rubus fruticosus* scrub (1 hedge), and

one hedge community not yet formally numbered but recognised as *Sambucus nigra-Urtica dioica* community in the 2000 review of NVC classification. Sixteen verges were surveyed (one hedge came right to the tarmac). Apart from the NVC **W8,** verge of Cuthbright Wood, 12 verges were **MG1** *Arrhenatherum elatius* grassland, two were **OV24** *Urtica dioica-Galium aparine* community, and one was **OV26** *Epilobium hirsutum* community. Disappointingly all the verges indicated the high nutrient levels typical of this arable community. Two hedges contained veteran woody species. One on Cuckoo Way had three substantial hawthorns indicating the line of an ancient routeway and a second hedge on Packman Lane had veteran coppiced holly. The survey is part of a larger 300 hedge survey co-ordinated by Rotherham MBC ecologist Carolyn Barber and Biological Records Officer Bill Ely.

BRYOLOGY (C. Wall)

Most of the available time was spent in Hawks Wood, with a brief visit to Old Spring Wood as far as Thorpe Top Treble Lock. The banks and bridges of the canal were investigated as far west as the crossing gates near Kiveton Park Station. Here it was hoped access could be gained to a nearby quarry, an old site for Flamingo Moss *Tortula cernua,* but this proved fruitless as the area was fenced off.

Hawks Wood was very productive and had a ground flora of typical calcicolous pleurocarps such as *Eurhynchium striatum, Thamnobryum alopecurum* with intermittent patches of *Cirriphyllum piliferum* and *Taxiphyllum wissgrillii.* The large leafy liverwort *Plagiochila asplenioides* was also met with periodically. The springs and wet flushes within the wood had abundant *Palustriella commutata,* as well as the thalloid liverworts *Conocephalum conicum, Pellia endiviifolia* and *Lunularia cruciata.* Steep banks near the Pudding Dyke Bridge entrance had exposed limestone 'ledges' which held an interesting bryophyte assemblage. On the rocks and thin friable lime deposits were *Fissidens dubius, Bryoerythrophyllum recurvirostrum, Ctenidium molluscum, Eucladium verticillatum, Tortella tortuosa,* a single patch of the tiny *Gyroweisia tenuis,* and the small leafy liverworts *Leiocolea turbinata* and *Jungermannia atrovirens.* Less calcareous niches in Old Spring Wood produced *Atrichum undulatum* and *Pseudotaxiphyllum elegans.*

The canal banks had common grassland species, but *Didymodon rigidulus, Plagiomnium rostratum, Cratoneuron filicinum* and *Rhynchostegium murale* were found on concrete and limestone debris. The bridges held common saxicolous acrocarps, including *Orthotrichum anomalum.* Less common, though perhaps under-recorded, was *Bryum radiculosum,* on mortar at Devil's Hole Bridge and on the bridge at Thorpe Top Treble Lock.

The epiphytes were notable for some fine fruiting *Orthotrichum pulchellum* on elders by the canal, and for *Metzgeria fruticulosa* on a sycamore by the railway crossing. It was here, by the crossing, that *Cololejeunea minutissima* was found growing on a spindle-tree. There is an unconfirmed 19th century record of this tiny leafy liverwort by George Stabler from Dentdale (VC65), but the first definite Yorkshire record was by Tom Blockeel at Whirlow near Sheffield in March 2008. This find, therefore, constitutes the second Yorkshire record. 61 species were recorded on the day.

ELLINGTON BANKS (VC64) 14 June 2008

INTRODUCTION (A. Norris)

Twenty-seven members and friends, representing 21 societies, attended this meeting near Ripon (NGR centrum SE281738). The day started off fine but damp, with light showers in the morning, but conditions improved later, becoming warm and humid. The meeting started slightly late, due to new road restrictions coming into force in Ripon that morning, which resulted in many members having to approach by alternative routes. Thankfully a number of moth traps had been run overnight by the Harrogate Naturalists' Society, and attendees enjoyed the opportunity to help unload the traps and examine the species found.

CONCHOLOGY (A. Norris)
The molluscan fauna proved to be fairly rich, a total of 38 species being recorded, 37 of them within the military grounds, with one *Succinea putris* found by Judith Allinson just outside and closer to the river. The ponds proved to be almost devoid of mollusca, only two freshwater species being located, *Pisidium subtruncatum* was found in two different ponds whilst *Galba truncatula* was found under stones in the damp depressions.

The driver training area with its dry banks produced two xerophilic species, *Cernuella virgata* and *Candidula intersecta*, but most of the species recorded were found in the damp woodland. The highlights included numbers of *Columella edentula* crawling up ash trees, along with *Merdigera obscura* and numbers of young *Lehmannia marginata*. The surprise of the day was two sub-adult specimens of *Zenobiella subrufescens,* a very local species associated with damp woodland. Not normally seen until August-September, but for some reason, possibly linked to the warmer winters of recent years, specimens of this species have been found in Yorkshire in the late spring at several locations in 2008. The early demise of the winter snail *Vitrina pellucida* found on site at an earlier visit in early April but not found on this occasion, and the early appearance of *Zenobiella subrufescens* may be coincidental, but might just be an early sign of global warming, with a consequential shift in lifespan and breeding patterns?

LEPIDOPTERA
Butterflies (Terence M. Whitaker)
The cool temperatures, brisk wind and frequent cloudy periods were rather unfavourable and restricted the butterflies to sheltered areas. *Pieris napi* were seen sheltering behind hedges and willow scrub near the ponds on the upper part of the site. Nearby on the scrubby calcareous grasslands *Polyommatus icarus* of both sexes and male *Coenonympha pamphilus*, the males engaging in territorial 'battles' and disporting in the occasional bright sunshine. The commonest butterfly seen, *Pararge aegeria*, was mainly confined to the clearings in the mixed woodland and conifer plantations leading down to the River Laver. Two specimens of *Vanessa atalanta* and *Pieris brassic*a were also reported.

Moths (Charlie H. Fletcher)
Moths are often poorly recorded on YNU excursions; to rectify this, five mercury vapour and two actinic traps were set up at dusk on the previous day and switched off at dawn. The catch was counted, recorded, and shown to interested onlookers at the beginning of the meeting. The site has a rich moth fauna especially among the microlepidoptera, and the site list stands at over 600 species. Unfortunately as luck would have it the weather was unseasonably cold. With clearing skies the temperature dropped from 8° at dusk to 6.5°C at dawn. Despite this, 54 species were recorded. The commonest moth was *Diarsia mendica* with 49 trapped. *Agrotis clavis* and *Anaplectoides prasina* were nice finds and it was interesting to compare both forms of *Biston betularia*. No species new to the site were recorded.

Among moths flying by day were *Camptogramma bilineata*, the pyralid *Pyrausta purpuralis*, and the grass moths *Crambus pascuella* and *C. lathoniellus*. A larva of *Theria primaria* was also found.

DIPTERA (Roy Crossley).
A total of 52 dipterans were recorded, which, with two exceptions, are common and widely distributed. Of the common ones, the very slender robber-fly *Leptogaster cylindrica* was present on the dry grassland near the entrance to the site, as was a single example of the handsome hover-fly *Chrysotoxum bicinctum*. Several specimens of the comparatively large metallic-green dolichopodid *Scellus notatus* were swept in typical habitat of short vegetation with scattered areas of bare ground. In all, a total of 14 dolichopodids were recorded during the meeting.

The group of small shallow ponds with attendant scrub and shrubs provided the two

most interesting records of the day, where sweeping emergent and marginal vegetation produced several examples of the scarce dolichopodids, *Hercostomus parvilamellatus* and *Diaphorus oculatus*. Until 1985, when it was found at Askham Bog, the only Yorkshire record of *D. oculatus* had been from Austwick and Lawkland Mosses in 1919. Since then it has been reported from Ashberry and Sand Dale in VC62 and Upper Dunsforth (VC64). The first Yorkshire record for *Hercostomus parvilamellatus* was from Wadworth Wood, Doncaster in 1983 and thereafter it was reported from several further sites in the south of VC63, and also, in 1990, from Thorne Moors. The first Yorkshire record outside VC63 was from Grimstone Wood (VC61) in 1996. Since 1999 records have come from calcareous carr and fen sites in eastern Yorkshire: Acklam, Howl Beck and Millington Springs, all on the chalk of VC61, and Chafer Wood (VC62). The occurrence of both sexes at Ellington Banks, the only VC64 locality to date, and well removed from previously recorded sites, suggests a probable breeding population and is of regional significance; the presence of this species, together with *Diaphorus oculatus,* is an indication of the potential of that small wetland area, which would probably repay further investigation across an entire field season.

ODONATA (Stephen Worwood)

The weather was not very conducive to recording in the morning with a stiff cool wind keeping the temperature down; hence only a few damselflies were present. After lunch the weather improved and the temperature increased, producing a better array of species with a final total of eight for the day: *Lestes sponsa,* a fresh single insect at one of the smaller ponds; *Pyrrhosoma nymphula,* two males and three ovipositing pairs; 30-40 *Coenagrion puella,* several in tandem and ovipositing; 20-25 *Enallagma cyathigerum*; four *Ischnura elegans* seen during the day; *Aeshna juncea*, one seen in the afternoon at an early date for this species; *Libellula depressa,* at the best site in the HDNS area for this insect, two ovipositing females, one in the larger ponds and one in the bomb crater area, two males and a freshly emerged teneral insect, the latter all at the larger ponds; also *Libellula quadrimaculata,* five present in all, at one of the larger ponds.

The site has a number of ponds, none particularly large. However, the largest area is in the lower conservation area nearest the entrance and produced most of the larger Dragonflies. The other main site consists of a series of bomb craters formed by explosive charges on the old engineers' demolition range, set among scrub and open grass areas, and all on the Magnesian limestone.

PLANT GALLS (Tom Higginbottom)

By the entrance to the site the aphid *Tetraneura ulmi* had caused a number of stalked club-shaped galls on the leaves of wych elm. The more common leaf roll caused by another aphid *Eriosoma ulmi* was also present. Three different galls were found on the leaves of alder. The common mite gall *Eriophyes inangulis* had caused distinctive pimples down the central vein of the leaf, while *Eriophyes laevis* had caused smaller pimples all over the leaf surface. Even more interesting was the fungal gall caused by the ascomycete *Taphrina tosquinetii* which had enlarged an alder leaf, causing large blisters on both surfaces. The sawfly *Pontania bridgmanii* had caused a bean gall on a leaf of goat willow. A small scar on the leaf surface of another sallow indicated there was a spherical gall on the lower surface, caused by the sawfly *Pontania pedunculi*. However, the most interesting discovery was caused by yet another sawfly producing a spherical gall with a warty surface on the underside of a leaf of the more locally common willow *Salix purpurea*. On oak there were a number of galls which had been caused by gall wasps. There were old examples of the marble gall *Andricus kollari* and the cola-nut gall *Andricus lignicolus*. The most interesting new season gall was the roughly globular swelling on a leaf blade caused by *Andricus curvator.* Two galls were recorded on herbaceous plants, the midge galls *Dasineura ulmaria* on meadowsweet and *Jaapiella veronicae* on germander speedwell. A total of 27 galls were recorded, but a visit later in the year would most likely increase this number.

BOTANY (P.P. Abbott)
The diversity of habitat provided a total of 173 vascular plant species. The calcareous grassland had a very good variety including numerous *Blackstonia perfoliata, Listera ovata* and *Dactylorhiza fuchsii*. There were a few *Ophrys apifera* and one stem of *Epipactis phyllanthes* – only the third VC record for this species. The woodland also had a good variety of common species, including two hybrid willows *Salix* x *multinervis* (*S. aurita* x *S cinerea*) and *S.* x *sericans* (*S. capra* x *viminalis*). The ponds were generally species-poor, but *Zannichellia palustris*, an uncommon species of lowland still water, was found in one. The sparsely vegetated banks in the driver training area had several species which are scarce, including *Echium vulgare, Sherardia arvensis, Catapodium rigidum*, *Reseda lutea* and *R. luteola*.

BRYOPHYTES (J.M. Blackburn)
Marshy ground near the car parking area had a profusion of *Calliergonella cuspidata*, with some *Drepanocladus aduncus* and *Aneura pinguis*. Ditches had *Cratoneuron filicinum, Dicranella varia* and small patches of *Leiocolea turbinata*. Other grassy places added *Campylium stellatum* var. *protensum,* whilst *Ctenidium molluscum* and *Rhynchostegium murale* were seen on rocks. A small stream added some variety, with *Palustriella commutata, Rhizomnium punctatum*, *Rhynchostegium riparioides* and *Conocephalum conicum*. Common woodland species were recorded, including a single patch of *Eurhynchium hians* and some *Plagiochila asplenioides*. Epiphytes were not abundant, but some ash and elders helped to boost the list, with *Dicranum tauricum*, *Orthotrichum affine, Rhynchostegium confertum, Ulota crispa, U. phyllantha* and *Zygodon viridissimus* var. *viridissimus* all present. A good find was fruiting *Cryphaea heteromalla* on a single ash tree, a moss which seems to be turning up more frequently of late in VC64. An area of coniferous woodland was visited, with just one or two species expected to be recorded. So it was a surprise when a large patch of *Cirriphyllum piliferum* was seen, along with *Eurhynchium striatum, Pseudotaxiphyllum elegans* and *Thuidium tamariscinum. Pohlia wahlenbergii* was growing on the footpath. An interesting day resulted in 60 species being recorded.

LICHENOLOGY (A. Henderson)
Only the north of the reserve was visited during the day. The surface of the army exercise ground was quite devoid of lichen cover, but concrete aggregate posts bounding the area supported a typical nitrogenous dust-influenced *Xanthorion*, including *Caloplaca crenulatella, Catillaria chalybeia* and *Scoliciosporum umbrinum*. A metal gateway leading from the area held a developing *Physcietum* community. On nearby *Crataegus* several lobes of *Physcia tenella* showed the yellowing sometimes observed when *Physcia* species grow contiguously with young *Xanthoria* thalli. Just inside the wood and pathed region beyond, *Crataegus* bore *Arthonia radiata, Amandinea punctata* and *Lecania cyrtella*, again in a *Xanthorion* population. On other hedgerow trees the lichen population was generally sparser.

Stones in marshy stretches had *Protoblastenia rupestris, Rhizocarpon concentricum, Sarcogyne regularis, Xanthoria calcicola, Verrucaria baldensis, V. muralis* and the easily overlooked, tiny-fruited pyrenocarp, *Thelidium zwackhii*. Wooden fenceposts along grass banking held extensive *Candelariella vitellina* and *Lecania erysibe*, the latter occasionally hosting the lichenicolous hyphomycete, *Marchandiomyces corallines*; also plentiful here were *Lecanora hageni* and *Micarea denigrata*. An aged oak at a path fork further on added two pinhead lichens, *Calicium viride* and *Chaenotheca ferruginea*, along with *Cladonia chlorophaea, C. coniocraea, C. fimbriata, Cliostomum griffithii, Lecanora carpinea, L. chlarotera*, *Lecidella elaeochroma* and the under-recorded *L. albella*. The day's total was 56 species, from an area hardly replete with lichens.

CHAROPHYTA (A. Henderson)
Several members collected stonewort specimens from the marshy areas and ponds about the site. These were later determined as *Chara virgata, C. vulgaris* v. *longibracteata, C. vulgaris* v. *papillata* and *C. vulgaris* agg.

THORP PERROW ARBORETUM NEAR BEDALE (VC65) 5 July 2008

INTRODUCTION (Janetta Lambert)
The meeting started at 10.30 am on a damp grey morning with rain forecast. The moth traps, set the night before by Dr Charlie Fletcher and his team of lepidopterists, were collected at the covered area in front of the tearoom. Owing to the favourable conditions during the night there had been a very large catch. Most of the morning was spent identifying and listing the large number of specimens, many of which made good subjects for photography. Rain with some heavy showers lasted until the afternoon, and the sandwich lunch provided for us at the tearoom was very much appreciated. Improvement in the weather allowed more serious work in the field (NGR centrum SE258851) until the meeting for reports which again took place at the tearoom. The President-elect, Dr Terry Crawford, took the Chair. After the reports a vote of thanks was made to Dr Fletcher for organizing the very successful moth trapping, to the staff who had helped with arrangements on the day, and to Sir John Ropner, owner of Thorp Perrow for unrestricted access to the Arboretum.

CONCHOLOGY (A. Norris)
It is well known that parkland, such as that at the Thorp Perrow Arboretum, is often very poor for mollusca and so it was a pleasant surprise to find a total of 26 species on the day. A visit there on 18 July 1982 had produced a total of 15 species, 6 of which we failed to re-find. This brings the total for Thorp Perrow to 32 species, a very respectable total for such parkland. The warm wet conditions brought out large quantities of slugs, particularly in the areas of mown grass close to the ponds. Those seen here included *Arion ater*, *A. subfuscus* and *A. flagellus*; the latter, a pest species, has been spreading rapidly throughout the county in recent years. The wet conditions highlighted how difficult it can be at times to separate these 3 species in the field. The highlights of the day included the subterranean slug *Boettgerilla pallens,* 4 of which were collected under logs in the children's play area, and a single specimen of the freshwater snail *Hippeutis complanatus* taken by Don Grant, a rare species in VC65, this being only the third record of this species in this VC.

LEPIDOPTERA (Charlie H. Fletcher)
Several moth traps, both MV and actinic, were set up at dusk on the 4 June and switched off at dawn. The traps were spread out to cover as many different habitats as possible. The promised cloud cover failed to materialise and the temperature dropped from a respectable 15° at dusk to a disappointing 9.5°C at dawn. The traps were inspected at the beginning of the meeting and an encouraging 89 species of moths were recorded and counted and shown to interested parties: 13 of these were site records, taking the site list to 261 species. *Cyclophora linearia* was new to VC65. Other interesting macrolepidoptera included *Leucoma salicis*, *Diarsia brunnea, Anaplectoides prasina*, *Pseudoips prasinana britannica* and *Perizoma flavofasciata*. Microlepidoptera which are uncommon in the VC included the pine-feeding *Lozotaeniodes formosanus*, *Olindia schumacherana*, *Orthotaenia undulana* and the beech-feeding *Cydia fagiglandana*.

A brief period of sunshine in the afternoon brought out some butterflies. Several *Maniola jurtina* were seen and also single *Pieris napi* and *Aphantopus hyperantus*. *Elophila nymphaeata* was seen flying by the stream and larvae of *Shargacucullia verbasci* were seen appropriately enough on *Verbascum*. Finally, the 'insectocutor' in the kitchen of the visitor centre was found to contain the tineid *Tinea semifulvella*. Many interesting

species in the past have come from this neglected source of insect records!

A number of small mayflies were noticed at the bottom of the traps after the moths had been removed. Many of these small mayflies had tiny green spheres attached to the end of their abdomens. A number of specimens were forwarded to Leslie Magee who kindly identified them as *Cloeon dipterum*, the females of which carry their egg clusters until such time as they are able to deposit them on water. Apparently, these mayflies emerge late in the day and, being attracted by light, are regularly found in light traps.

PLANT GALLS (Tom Higginbottom)

Searching for galls in an arboretum is always a challenge. There is always the question whether native galls have colonized trees from other parts of the world. Interestingly two common oak galls were found on the large leaves of *Quercus macrantha*, the Caucasian Oak. They were the silk button spangle gall, caused by the gall wasp *Neuroterus numismalis,* and the raised pin-like puncture on the upper surface of the leaf blade, caused by the psyllid *Trioza remota*. On a large-leaved whitebeam there were many examples of the mite gall *Eriophyes arianus*. The midge gall *Hartigiola annulipes* was present on *Fagus sylvatica,* and also on copper beech. An *Acer* species was host to the pimples of the mite gall *Aceria cephaloneus*. Some of the shoot tips of box had been thickened into a small cabbage shape by the psyllid *Spanioneura buxi*. A fungal gall *Cumminsiella mirabilissima* was present on the underside of the leaves of Oregon Grape. Another fungal gall, the smut *Microbotryium violaceum* was easily discovered on the anthers of red campion, which had been changed in colour to a purple-black and were also enlarged. In all 37 galls were recorded, whereas a visit in August 1998 produced a total of 47. Generally late summer is often a better time for recording galls.

BOTANY (D.R. Grant)

Heavy rain and lack of vegetation owing to recent cutting of grass and adjacent areas made finding species difficult; the only visible species was *Rubus dasyphyllus*. The two ponds were the best areas for exploration: here were *Hippuris vulgaris* and *Potamogeton natans*, one area had *Eleocharis palustris* and *Polygonum amphibium*, and the rarest plant was *Juncus subnodulosus*. Careful searching in the woodland yielded *Campanula latifolia, Lilium martagon* and *Poa nemoralis*.

BRYOPHYTES (J.M. Blackburn)

The day started with an examination of the open grassland; this produced the expected species, *Rhytidiadelphus squarrosus* and *Calliergonella cuspidata*, but *Scleropodium purum* was not seen. The ground in the wooded areas, particularly Spring Wood, was more productive. *Atrichum undulatum*, the attractive *Cirriphyllum piliferum*, *Eurhynchium striatum*, *Mnium hornum*, *Plagiomnium undulatum*, *Polytrichum formosum* and *Thamnobryum alopecurum* were all present, and small patches of *Plagiomnium rostratum* were recorded. The ornamental trees were disappointing, probably due to a predominance of acidic bark. However, ash and oak were present; the ash trunks had much *Hypnum cupressiforme*, good patches of *Orthotrichum affine*, *O. diaphanum* and, exceptionally, several tufts of *Grimmia pulvinata*, while *Metzgeria furcata* was seen on an oak trunk.

Stream and ditch sides had *Cratoneuron filicinum, Rhynchostegium riparioides* and two thalloid liverworts, *Conocephalum conicum* and *Pellia epiphylla,* whilst an old trunk in a damp area had a mass of *Rhizomnium punctatum*. A concrete wall supported much *Bryum capillare*, *Grimmia pulvinata* and *Schistidium crassipilum*. Although the rain reduced recording time, it was likely that little would have been added to the 34 species recorded.

LICHENOLOGY (A. Henderson)

Despite the discouragement of frequent very heavy rain in the morning, the areas of the Acer Glade, the Bog Garden and Spring Wood were explored, revealing an expected flora of shaded parkland. *Evernia prunastri* was seen, but the commonest macrolichen was

Parmelia sulcata, infrequently accompanied by *Punctelia subrudecta*. Around tree bases *Cladonia coniocraea* was occasional. The most striking species in the crustose flora was *Candelariella reflexa*, its bright yellow sheets immediately evident on shaded branches. On vertical branches, *Cliostomum griffithii*, *Arthonia radiata, Chaenotheca ferruginea* and *Opegrapha atra* were occasional to common.

The afternoon was spent in the neighbourhood of Laburnum Walk, the Main Avenue and the Monument. The Monument supported liberal *Lecanora erysibe*, some of the sorediate form. A nearby pathside tree (W68) had a flora similar to that on most of the trees examined in the afternoon: *Amandinea puncata* common in a *Xanthorion-Physcietum* with only infrequent *Lecidella elaeochroma*. *Micarea denigrata* and *Lepraria lobificans* were on the stretch of boundary fencing just west of the Monument. Fashioned stonework and the odd boulder seen through the day added *Aspicilia contorta* to the list along with the six pyrenocarps: *Thelidium incavatum, Verrucaria baldensis, V. fuscella, V. hochstetteri, V. muralis* and *V. nigrescens*. The day's list totalled 44 species. but a more extensive study in kinder weather would doubtless add many more species.

CHAROPHYTA (A. Henderson)
Stonewort material collected by D.R. Grant from the New Lakes was later determined by A.H. as *Chara virgata*.

NORTH CAVE WETLANDS (VC61) 26 July 2008

INTRODUCTION (Sarah Priest)
On one of the few warm and sunny days in an otherwise cool and wet summer there was a turn-out to match the weather, with 27 members on the attendance list. This is a relatively new YWT reserve (NGR centrum SE887328), comprising gravel pits in various stages of development offering a range of habitats for birds and colonising plant and animal species. Thus the 2008 excursion will provide a useful baseline against which to judge changes when the YNU makes another visit. As it is primarily a bird reserve, it was not surprising that the ornithologists had a particularly fruitful day, starting with a singing corn bunting in the hedge by the car park. However, pride of place among the reports must go to the botanists with the discovery of a mint new to Britain, *Mentha cervina*, a south-west European species, identified by Phyl Abbott and confirmed by the BSBI referee Eric Clement. At the tea and meeting in the Village Hall, 18 affiliated societies were represented and the chair was taken by the President-elect, Dr Terry Crawford. Thanks were expressed to the YWT for permission to visit their reserve, and in particular to Stephen Martin, the reserve manager, for all his help in arranging the visit.

ORNITHOLOGY (K.G. White)
North Cave Wetlands is managed primarily as a bird reserve and we were not disappointed, with an impressive day total of 67 species. Data obtained from this site will be submitted to the BTO Atlas 2007-2011 for 10 km square SE83, tetrads R & W. On arrival at 9.30 am, there was a male corn bunting singing from the hedge of a field of spring barley adjacent to the reserve and it continued to sing on and off all day, giving excellent views. We were also delighted to find turtle dove, juvenile cuckoo, tree sparrows, lesser whitethroat, snipe, dunlin, water rail, common sandpipers and a calling quail, in addition to good numbers of grebes, ducks, geese and swans. Particular note was taken of any evidence of breeding (e.g. juvenile birds or adults feeding young) in order that these may be submitted as roving records, as proof of breeding for the new BTO Atlas. Such evidence was observed in a total of 18 species including tree sparrow, sand martin, common tern, swift, great crested grebe, shelduck, gadwall, tufted duck, black-headed gull, coot and moorhen. Birds still singing included reed bunting, reed warbler and sedge warbler.

CONCHOLOGY (A. Norris)
Our small party visited all four of the 1 x 1 km squares comprising the wetland area (SE8832, 8833, 8732 & 8733), and recorded a total of 22 species, only four of which were freshwater species. The site was notable for the numbers of introduced, adventive and pest species, of which the large numbers of the freshwater snail *Physella acuta* were perhaps the highlight of the day. Samples collected at various points throughout the reserve suggested that more than one species of these freshwater snails occurred, but dissection proved them all to be the one species. One of the larger lakes produced a single specimen of *Radix auricularia*, a freshwater species which is scarce in the East Riding of Yorkshire.

ENTOMOLOGY (Roy Crossley)
Members of the YNU Entomological Section undertook an investigation of North Cave Wetlands during 2007, and some recording work is on-going. A preliminary list of Diptera was produced at the end of the 2007 field season and a copy is exhibited in one of the hides; reports on other insect orders are in course of preparation. Thus, for the entomologists present, this was a return visit to a recently well-worked site. In such places as North Cave where a variety of habitats is dynamically evolving, new insects are being continually discovered. Many of these are likely to be opportunistic wind-blown invaders which may not belong to an established population.

The muddy southern margins of Village Lake were productive, as usual, and several flies were found that were new to the Reserve list. These included the metallic fly *Dolichopus agilis* (Nb); a vague record of this species for 'Bradford' in 1886, and records for Allerthorpe in 1927 and from the RSPB reserve at Blacktoft Sands in 1980 constitute the only previous reports of this species from Yorkshire, so the single male now recorded from North Cave may prove to be of future significance if it proves to be established there. A single female of another dolichopodid, *Hercostomus fulvicaudus* I found on the shore of Main Lake is only the second record for the county, the first being two males and two females in water traps set in *Phragmites* beds at Blacktoft Sands in 1978.

Frank Kenington recorded *Harmonia axyridis,* the rapidly spreading 'Harlequin Ladybird, which Bob Marsh had found at North Cave a few weeks earlier, and I took a couple of specimens the following week. So, this recent addition to the Yorkshire list of beetles appears to be present in some numbers. Peter Kendall and Bob Marsh report the weevil *Tychius meliloti,* associated with Ribbed Melilot *Melilotus officinalis* growing on the southern edge of Village Lake; Bob Marsh comments that this is a scarce species for which most Yorkshire records are very recent, so it may be increasing. There was also evidence at Village Lake of the weevil *Gymnetron villosulum* producing the characteristic enlarged seed capsules on *Veronica anigalis-aquatica*. This Notable B species was first found at North Cave by Bill Dolling in 2007 and Peter Kendall comments that he was surprised to find so many infected plants; the species appears to be doing exceptionally well, as is often the case with new arrivals at a site.

Peter Kendall has also forwarded a list of Odonata he recorded on the day, which in view of the popularity of these insects amongst present day bird-watchers is listed here in full: *Aeshna grandis, Enallagma cythigerum, Ischnura elegans, Libellula quadrimaculata, Orthetrum cancellatum, Pyrrhosoma nymphula* and *Sympetrum striolatum*.

LEPIDOPTERA (Terry Crawford)
We enjoyed by far the best weather for Lepidoptera of all the 2007 and 2008 Field Excursions. Widespread across the Reserve were *Thymelicus sylvestris, Pieris brassicae, P. brassicae, P. napi* and *Aglais urticae*. The Satyrinae were represented by a few *Pararge aegeria* in the more bushy and scrubby areas, and more generally by large numbers of *Pyronia tithonus* (beautifully fresh), *Maniola jurtina* and rather worn *Aphantopus hyperantus*. Singletons of *Gonepteryx rhamni, Celastrina argiolus* and *Polygonia c-album* completed the butterflies. Diurnal moths were well represented by *Scotopteryx chenopodiata* and an abundance of *Zygaena filipendulae* on flower-heads; there were also

good numbers of Cinnabar larvae *Tyria jacobaeae* on ragwort. Single specimens of *Mesoligia furuncula* and the Pyralid *Elophila nymphaeata* were seen, the latter amongst emergent vegetation near the edge of one of the Dragonfly Ponds (the larvae and pupae are aquatic). The most extraordinary find was by the conchologists when they turned over a large log looking for molluscs and discovered a clutch of three *Mesapamea secalis* or indistinguishable in the field *M. secalella* nestling underneath.

BOTANY (R. Middleton)

The reserve provided a rewarding day's botany, almost 200 taxa being recorded. The light sandy soils here provide a suitable substrate for a range of clovers including *Trifolium campestre* and *T. arvense* along with the locally abundant *Geranium pusillum*. The 'Maize' field gave a regionally characteristic suite of weedy species including *Spergula arvensis*, *Urtica urens*, *Anchusa arvensis* and *Viola arvensis*. There were also vast swathes of the alien *Amsinckia micrantha* with lesser amounts of the presumably planted and now increasingly common *Phacelia tanacetifolia*. Topsoil stripped before quarrying the gravels in this area is frequently exported to Hull where this suite of weedy and sand-loving plants is often found on newly seeded roadside verges.

Although the lakes and ponds are at an early stage in their development, there was a wide range of marginal species to be found, including *Samolus valerandi*, *Lycopus europaeus* and *Lythrum salicaria*. The aquatic species were more restricted and usually dominated by charophytes, *Potamogeton crispus* and *P. pectinatus*. The flora of the newly created Dragonfly Ponds, where several non-native plants had been introduced, generated considerable interest. A very well established mint has now been confirmed as Hart's Pennyroyal *Mentha cervina,* a new addition to the British Flora. It was, however, generally considered that it would be advisable to remove the very invasive *Myriophyllum aquaticum* before it becomes a problem.

The reserve has been extensively planted with a wide range of shrubs which, it was noted, would confound anyone trying to date the hedges using Hooper's rule. The great majority of these were native species including *Cornus sanguinea*, *Viburnum opulus*, *Salix* and *Ilex aquifolium* with a sprinkling of cultivars such as *Alnus cordata* and *Sorbus intermedia*. The choice of species was presumably strongly influenced by the value of their seeds and fruit to birds or, as in the case of *Frangula alnus*, butterflies and other insects. Although the area is still botanically rich, it is interesting to compare the plants present with a list made over twenty years ago. Many fewer species were encountered then but there was a group of plants including *Ornithopus perpusillus*, *Scleranthus annuus* and *Rumex acetosella* which seem to have vanished. It may be that the quarrying operations have exposed a more calcareous substrate at the expense of leached and acidic sands which were once at the surface.

BRYOLOGY (J.M. Blackburn)

The extensive grasslands on the site produced very little bryophyte cover, with *Brachythecium rutabulum* and *Eurhynchium praelongum* being the only species found. It was a welcome relief to find an area of springs on the slope beyond the first hide on the main track in from the entrance gate. This area had three thalloid liverworts, *Aneura pinguis, Marchantia polymorpha* ssp *ruderale* and a *Pellia* species; also seen here were *Calliergonella cuspidata, Cratoneuron filicinum, Dicranella varia, Didymodon fallax* and *Philonotis fontana*.

LICHENOLOGY (M.R.D. Seaward & A. Henderson)

A variety of trees and shrubs (*Acer campestre*, *Alnus glutinosa*, *Prunus* sp., *Sorbus aria* and *S. aucuparia*) in the hedgerows of the Nature Reserve supported a reasonably diverse lichen flora (16 species), the most interesting ones being *Arthonia radiata*, *Lecanora chlorotera*, *L. persimilis* and *Lecidella elaeochroma*. A range of other substrata (lignicolous, saxicolous and terricolous) supported a further 13 species, including

Caloplaca crenulatella, a common but previously overlooked lichen of horizontal concrete surfaces. Additional visits were made to the churches (and their churchyards) of North and South Cave, the former containing 30 and the latter 36 saxicolous species.

HAWNBY ESTATE (VC62) 9 August 2008

INTRODUCTION (J.M. Blackburn)
It was pleasing that 24 members attended the meeting despite inclement weather. Conditions did improve after lunch. However, the entomologists and ornithologists had a poor day and several left the meeting early. Birds seen included snipe, willow warbler, chaffinch and wren. The indoor meeting in Hawnby Village Hall was attended by 13 members representing 15 affiliated societies. A lively discussion included reference to the pheasantry in Spring Wood, which has had an adverse effect in this SSSI, particularly if the pens are moved successionally within the wood. It has to be acknowledged however, that pheasant shooting plays a part in the commercial viability of the estate. Thanks were expressed to the owners of Hawnby (NGR centrum SE543894), to whom copies of the reports will be sent in due course.

MAMMALS (John Newbould)
A roe deer was seen south of Nag's Head Wood and a stoat was seen at the western end of Peak Scar Wood. Interestingly, returning to Harrogate, we recorded two hedgehogs in Ryedale and three in the Ripon area as road traffic casualties.

ORNITHOLOGY (John Newbould)
Very few birds were seen during the day, the most noteworthy observation being a jay in Coomb Hill Wood. However, by the village hall, we were rewarded with a small flock of house sparrow in a thorn hedge. This Red Data Book species seems to be found near settlements with suitable bushes for protection, not only in Yorkshire but also in Dorset villages. In addition, two swallows, goldfinch, chaffinch and great tit defied the rain.

CONCHOLOGY (A. Norris)
Despite the torrential rain which persisted most of the morning and resulted in missing the track into the main area of woodland, Terry Crawford, Tony and Moira Wardhaugh and I visited three 1 x 1 km squares (SE5389, 5390 & 5489) in the course of the day, 33 species being recorded and 52 individual records being added to our recording scheme. *Candidula intersecta* and *Pyramidula pusilla* were confined to the limestone scree on Hownby Hill, whilst others such as *Cornu aspersum, Arion flagellus* and *Tandonia budapestensis* were only found in a garden in the centre of the village. A small marsh to the south provided examples of the amber snails *Oxyloma elegans* and *Succinea putris*.

LEPIDOPTERA (John Newbould)
Apart from a few grass moths e.g. *Agriphila straminella* seen flying, Lepidoptera records were confined to leaf mines, with four species being recorded. Of note was a single mine on *Sorbus aucuparia* of *Stigmella aucupariae* and the mine of *Stigmella microtheriella* on *Corylus avellana*.

COLEOPTERA (M.L. Denton)
In an attempt to avoid the continuous rain, it was decided to take refuge in Peak Scar Wood. After an hour of almost fruitless searching, however, it was decided to call it a day. By this time the sieve was filling with water so rapidly that any woodland beetles located were becoming honorary water beetles! The only species found on the woodland floor were the common Carabidae *Abax parallelepipedus, Patrobus atrorufus* and *Notiophilus biguttatus*. A large stand of well composed *Laetiporus sulphureus* produced the following

common Staphylinidae: *Lordithon lunulatus, Atheta aeneicollis, A. crassicornis* and *Stenus impressus*. *In situ* recently felled trees had created a habitat which would benefit saproxylic invertebrates. Although the weather precluded any serious collecting attempts, this decomposing wood will, in time, provide a vital habitat for theses dead wood-dependent species. In comparison with nearby classic localities such as Duncombe Park and Rievaulx, the woodlands of the Hawnby Estate are little known and warrant further investigation.

DIPTERA (A. Grayson)

The dipterists had a very early curtailment to their excursion due to the ever-intensifying rain; nevertheless, Roy Crossley took an interesting series by sweeping riverside vegetation near Dalicar Bridge (SE538897); here were two nationally notable species, *viz.* the northern and upland crane-fly *Eloeophila apicata*, and the empid *Hilara albiventris* which is associated with river systems in proximity to sand, gravel or shingle, and has only been found in Yorkshire along the rivers Rye, Swale and Wharfe. Roy Crossley also took the following suite of typical late summer *Hilara* from the riverside near Dalicar Bridge: *H. chorica*, *H. flavipes*, *H. fuscipes*, *H. nigrina* and *H. obscura*, together with other predatory flies, including *Platypalpus albicornis*, *P. maculipes*, *Gymnopternus aerosus*, *Sybistroma obscurellum*, *Campsicnemus curvipes* and *Sympycnus desoutteri*. The writer found the soldier-fly *Sargus bipunctatus* amongst lush vegetation at SE536896.

BOTANY (Don Grant)

Members took the road leading west from the village hall. In the hedgerow were some *Prunus padus* trees which still had a few black cherries remaining, the foliage having been destroyed by moth caterpillars. Further along towards Church Bridge, *Viburnum opulus, Ligustrum vulgare* and *Rubus dasyphyllus* were noted. The party crossed over the bridge and examined a damp area by the River Rye. Here there was a small patch of *Isolepis setacea* growing with *Carex hirta*. After lunch, members climbed up the slope into Spring Wood. On the woodland edge a colony of *Rubus echinatoides* was found in an open area; this species is unusual in the county, having a very scattered distribution. By the side of the woodland footpath, members discovered a small colony of *Rubus saxatilis*, a rare species confined to limestone dales. Several metres away were plants of *Paris quadrifolia*, many with black fruits just showing above the ground flora of *Mercuralis perennis*; also here was a little *Rubus caesius*.

Members then moved down the valley past Dale House where there was a large bush of *Rubus vestitus*, the form with pink flowers. In the valley near Gowerdale House the stream was examined. It had large stands of *Rorippa nasturtium-aquaticum* growing with *Myosotis laxa, Ranunculus flammula* and *Juncus acutiflorus*. The party then climbed up the valley side to Noddle End and Gowerdale Wood. Here a small bank had exposed rocks of Jurassic Limestone; many calcicolous plants were here, including *Primula vulgaris, Leontodon hispidus, Origanum vulgare* and *Thymus polytrichus*. There was also a large stand of *Hieracium eboracense* (a leafy Hawkweed in section Tridentata); also in the vicinity were *Verbascum thapsus, Briza media, Carex flacca* and *Agrimonia eupatoria*. In the village by the bridge there was a colony of *Calystegia pulchra*. Other members reported from other areas *Campanula latifolia, Gentianella amarella* and *Phyllitis scolopendrium*.

LANDSCAPE (John Newbould)

Driving rain all day made detailed recording using maps difficult. The settlement of Hawnby is located at the southern tip of a dale stretching 7 km to the north, but the recording area also extended into the western parish of Arden with Ardenside. However, a useful day was spent with Tom Higgingbottom looking for plant galls. The first place of interest was a south-facing roadside verge, just west of South Farm. Of particular interest was *Sanguisorbia officinalis* and *Centaurea nigra* in NVC **MG1** grassland. To the west, nearer Dalicar Bridge, a 5-species hedge was noted, with *Fraxinus excelsior* and *Betula*

pendula on a 3 m high bank. The bank contained 12 species of herbs, including *Geranium pratense* and *Centaurea nigra*.

Towards lunchtime, the woodlands around Coomb Hill were investigated; firstly, the north end of Carr Woods, which are a mixed plantation over semi-natural NVC type **W10** oak-birch woodland. A fence coupled with a heavy bracken margin (NVC type **W25**) made surveying difficult, resulting in a list from the margin. Wet areas contained *Alnus glutinosa* resulting in areas of NVC type **W6.** On a better day, it would have been possible to estimate the extent of the wet woodland which gives this area its name. Importantly, the public footpath was lined with *Quercus robur*, the largest of which was estimated to have a diameter of 1.5 m. There was also a number of large *Crataegus monogyna*, including a coppiced example of at least 0.6 m diameter (considered by DEFRA to be truly ancient), which had blown over exhibiting Phoenix regeneration.

The track around Coomb Hill follows the 200 m contour through an interesting area with a mixed geology; initially the plantation area had a mixed bracken ground cover. On the hill slopes were areas with *Acer campestre, Corylus avellana* and *Fraxinus excelsior* with a *Brachypodium sylvaticum-Mercurialis perennis* ground cover indicating NVC type **W8** woodland. On the northern slope was *Quercus robur-Betula pendula* woodland together with *Sorbus aucuparia* and *Lonicera periclymenum* and interestingly both a *Deschampsia flexuosa-Vaccinium myrtillus* and *Holcus mollis-Hyacinthoides non-scripta* ground flora of NVC type **W10** woodland. Leaving Coombe Wood on the western margin is a track south of Nag's Head Wood. Of particular note along this track were an ancient hawthorn field boundary running north-west and a field boundary following a stream from Spring Wood running north-east along an alder brook.

We also visited the churchyard, which is large for such a small village. Here in spite of the absence of management were a number of herbs. Apple Mint *Mentha* x *villosa* was found adjacent to the church. Herbs of note included *Campanula rotundifolia, Lotus corniculatus* and *Stachys officinalis* in an area which had been damaged by flooding recently and would benefit from sheep grazing each autumn. In addition, the churchyard contained a number of trees including the obligatory *Taxus baccata*. Finally we visited the western end of Peak Scar Wood, which from the number of discarded tree protectors seen appears to have been reasonable herb-rich grassland in the recent past. Here, a number of trees associated with ash-maple woodland species such as *Acer pseudoplatanus, Sorbus intermedia* and *Viburnum opulus* have been unnecessarily introduced, which, if the area were left to its own devices, would become native woodland. A feature of the area worthy of investigation is the extent of old veteran trees and hedgerows.

BRYOPHYTES (J.M. Blackburn)

The first part of the day was spent at Peak Scar, an area of cliff and rocks, earlier visits to which had proved most rewarding. The rocks were clothed in *Thamnobryum alopecurum*, with much *Anomodon viticulosus, Ctenidium molluscum, Cirriphyllum piliferum* also present. More careful searching revealed *Dichodontium pellucidum, Neckera complanata, Plagiomnium affine, P. cuspidatum* and *P. undulatum,* with small amounts of *Rhynchostegiella tenella* and *Tortula marginata*. Liverworts on the rocks included *Plagiochila asplenioides* and *P. porelloides*, the tiny *Leiocolea turbinata* and, finally, *Apometzgeria pubescens*, only the fourth extant record for this plant in the VC. Trees in this sheltered site supported *Metgeria fruticulosa, M. furcata, Orthotrichum affine, O. pulchellum* and *Zygodon conoideus*. Fortunately, felled or dead wood has been left in place, which has enabled both *Nowellia curvifolia* and *Riccardia palmata* to become established. Species on and around rocks on the hillsides above Dolicar Bridge included *Campylium protensum*, *Ditrichum gracile*, *Isothecium alopecuroides* and *Rhytidiadelphus triquetrus*. A visit to the riverbank by Dolicar Bridge added to the list four *Dicranella* species, *D. schreberiana, D. staphylina, D. varia* and *D. rufescens,* the latter always a welcome sight.

After lunch a brief visit was made to Carr Wood, a marshy area, which added *Dicranum tauricum* to the list. Finally Coomb Hill, an area of coniferous woodland, was

visited; this provided a very different environment for bryophytes. The banksides were quite rewarding, with *Dicranum scoparium, Eurhynchium striatum, Plagiothecium undulatum, Scleropodium purum* and several patches of *Sphagnum capillifolium* var. *rubellum*. Tucked into the banksides were small amounts of *Aulacomnium androgynum, Tetraphis pellucida, Calypogeia muelleriana* and *Riccardia chamedryfolia*. The track itself had *Cratoneuron filicinum*. There was insufficient time to reach the higher ground. This area is excellent for bryophytes and, despite the interruptions for rain, a total of 81 species was recorded.

LICHENOLOGY (A. Henderson)
For all the morning's rough and turbulent weather, an enjoyable and productive time was passed in examining the building and garden walls of the village. Noticeably attractive on the sidewall of the village hall were the bright russet-orange-yellow discs of *Caloplaca saxicola*. The house opposite had a garden wall coping entirely covered by a well developed community including *Aspicilia calcarea, A. contorta, Cladonia fimbriata, C. pocillum, Lecanora crenulata, Leproloma vouauxii, Myxobilimbia sabuletorum* and *Pertusaria amara*. The upper bar of the shaded wooden gate a little further on towards the church had stretches of *Lecanora polytropa* and *Porpidia tuberculosa*, while elder in a hedge close by bore a plentiful *Xanthorion-Physcietum* with *Physconia grisea*. The various substrates offered by the church and churchyard produced a largely acidophile set of species with the occasional calciphile intrusion. Neon-green powdery expanses of *Psilolechia lucida* were evident on tombstones and sheltered wall faces, contrasting with the well-formed white crustose discs of *Ochrolechia parella* and *Tephromela atra*. *Parmelia sulcata, Hypogymnia physodes* and *Melanelia fuliginosa* ssp. *fuliginosa* were the accompanying foliose species. *Haematomma ochroleucum* v. *ochroleucum*, together with several species of *Porpidia* and *Lecanora* provided a duller background flora, occasionally lightened by a thallus of golden *Caloplaca flavescens*. *Opegrapha calcarea* and *Lecanora sulphurea* occurred amongst the tombstone flora. A hole in the pathside bank was a typical site for *Leproloma vouauxii*. After a warming lunch in the modestly named "Inn at Hawnby", Arden Hall was visited and produced one of the day's best records, *Bacidia adastra*, growing amongst a *Xanthorion* with *Arthonia radiata* and *Lecania cyrtella*. Lichen species recorded during the day totalled 77.

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